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MiniMech™

Documentation kit

Doc. No. 8030763 / 05-EN
Date: 2010-02-05

Preface

This manual contain all manuals necessary to service and use Talaris MiniMech™ 010.

These manuals are not intended to be self-instructing.
The service engineer and user must have proper training before using these manuals.

Different revisions are described and the reader must observe which revision the text and illustration refer to.

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1.	**Integration Manual**	**8030756-08**
2.	**Users Manual**	**8030758-02**
3.	**Service Manual**	**8030760-02**
4.	**Parts List MM 010 L2**	**8030766-05**
5.	**Parts List NRC 010 L2**	**8030761-04**
6.	**Recommended Spare Parts**	**8030765-02**
7.	**CCRM**	**8030759-05**

Obligations of the user

- Everyone working with the machine must read this manual.
- Observe the safety instructions and warning labels.
- Talaris or its representative should replace damaged safety devices such as fuses and warning labels immediately.

	ATTENTION
	The indication ATTENTION warns of the danger of minor physical injury or damage to equipment.
	ATTENTION
	Electrostatic sensitive device. Observe ESD precautions before handling.
	ATTENTION
	The indication WARNING warns you of the danger of serious physical injury
	DANGER TO HANDS:
	The indication warns of possible injuries to the hands. Remember, to take extra care when cover plates have been removed. Beware of fast moving mechanical parts especially when cover plates are removed. Always replace cover plates after completing work. To avoid injury, use the following precautions: Always hold the modules on the handling points, marked in green. Close carefully the safe door and covers.
	ELECTRIC SHOCKS
	The indication warns of possible injuries through electrical voltages. Improper work on the electrical components can lead to life threatening injuries from electric shocks! Unprofessional handling or incorrect connections can result in the machine no longer being safe for operation. <u>Electrical work shall only be performed by qualified personnel (electricians)!</u> Remember, to take extra care when cover plates have been removed, units disconnected, or circuit boards unplugged. The power supply contains unswitched line voltage. Never leave a part-serviced machine connected when unattended. When connecting the equipment to a 240V AC supply in the United States and Canada, it is necessary to connect via a double pole 20A circuit protector.
	WARNING:
	Due to the nature of his work, an operator or service technician may have to bypass normal safety interlocks and features to carry out some of the instructions in this manual. Always restore safety interlocks after completing work. At any risk or danger, disconnect the mains cable at the rear of the machine from the mains outlet. CAUTION; Please note that if the machine contain Lithium Batteries there is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

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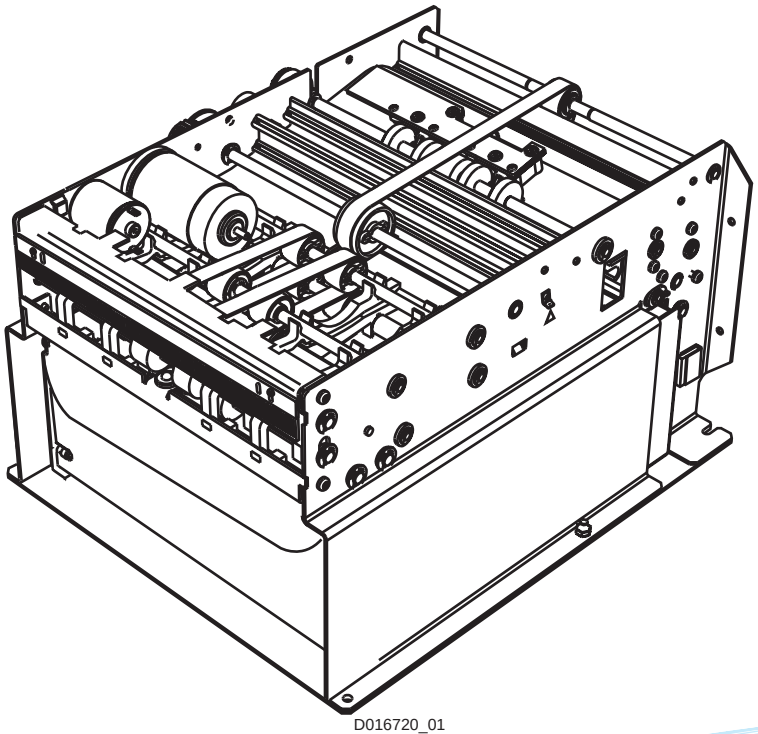
MiniMech 010

Integration Manual



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Doc. No. 8030756/08-EN
2008-11-14

Preface

MiniMech, is the name of a Talaris Dispenser for ATM use.
The manual comprises instructions for installation of MiniMech;

- data for preparation of the site
- instructions for installation, mechanically as well as electrically
- instructions for operating the Minimech

Talaris Cash Dispensing AB
Flen, SWEDEN

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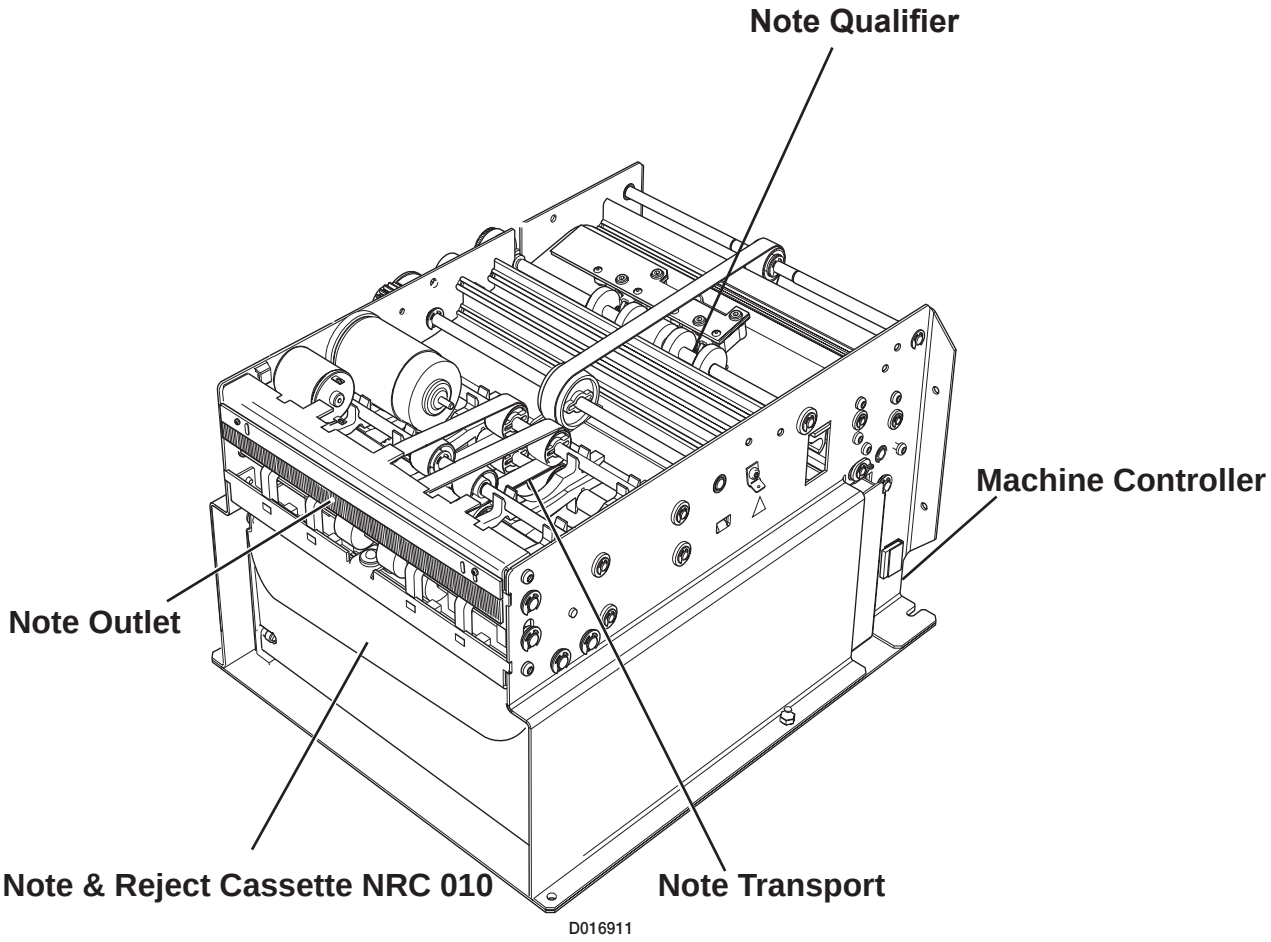
MiniMech

Machine overview



general

General

This section describes different alternatives of installation and other general requirements.

When planning the MiniMech installation, the following "four modes of operation" must be considered:

- Normal operation
  The transport of notes through the delivery slot is controlled by the host computer. The MiniMech needs not to be accessible.
- Refilling / exchanging the note box
  Space must be available to enable withdrawal and insertion of the note box.
- Operator maintenance
  Space must be available at the rear and top side of the MiniMech to enable access to the transport path for removing stuck notes in case of fault.
- Service and maintenance
  Space must be available around all sides of the MiniMech. This can be achieved by mounting the MiniMech so that it can be removed from the cabinet.

Safety and EMC requirements

The system manufacturer is responsible for making sure that the appropriate safety and EMC requirements are used.

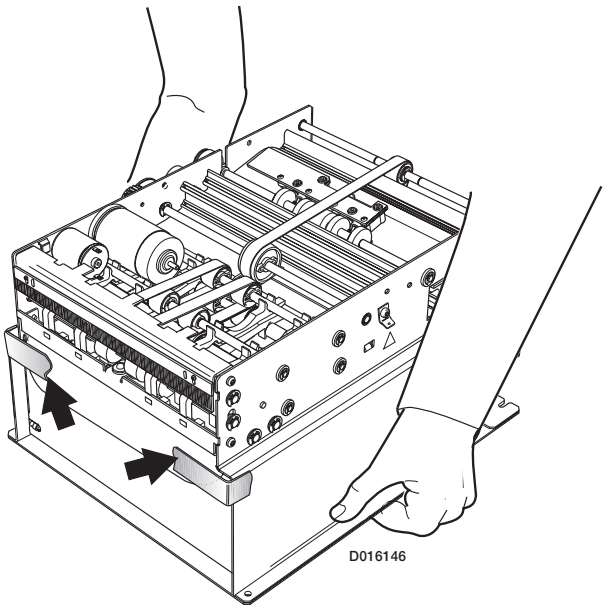
Assembling the MiniMech in a cabinet.

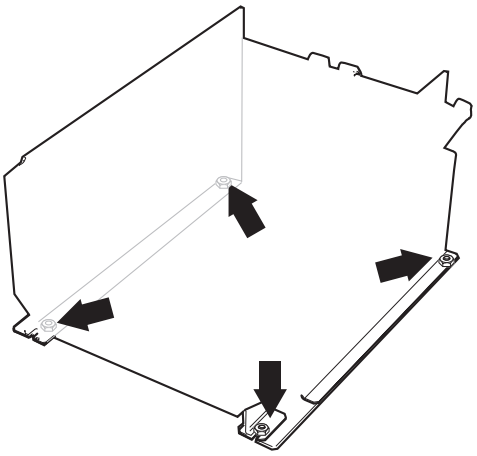
When assembling the MiniMech into a cabinet, we recommend the use of the two slots and two holes as shown in diagram to firmly attach the MiniMech into the cabinet.

Recommendations for transporting, pulling and lifting MiniMech

The original packaging is designed to ensure safe travel for the MiniMech. We therefore recommend that you do not dispose of the packaging as it can be used for future transportation.

When lifting the MiniMech, lift as shown below. When transporting the MiniMech and not using the original packaging the Cassette must be secured with tape as shown below.





Power Supply

The MiniMech requirements and recommendations for an external power supply is as follows:

Input Connector
The AC-mains connector is recommended to be IEC-320 style.

Output connector
The DC-output connector must consist of an AMP MTA156 2-pos connector with "locking ramp" or equivalent.

DC output voltage
+24.0 V, ! 10%
SELV output and Limited Power Source

Load current, continous
Min - 0.1 A
Max - 2.0 A

Load current, peak
Max 3.0 A, duration 100 ms

Pin assignements
Pin 1 - 0V return
Pin 2 - +24 V

Over voltage protection
The +24 VDC must not exceed 30 volts.

Additional
On request Talaris can supply a power supply, P/N A008263, to run the MiniMech.

As an option Talaris can supply a std RS 232 communication cable - refer to page 13.

Weight

MiniMech	4.8 kg (with empty NRC 100)
NRC 100	1.35 kg (without notes)

Power Supply 0.4 kg (optional)

Climatic Requirements

Temperature

Operating	+5 to +50 °C / +41 to +122 °F
Storage	-5 to +60 °C / +23 to +140 °F
Transport	-40 to +70 °C / -40 to +158 °F

NOTE!
The transport temperature is valid for 72 hrs maximum.

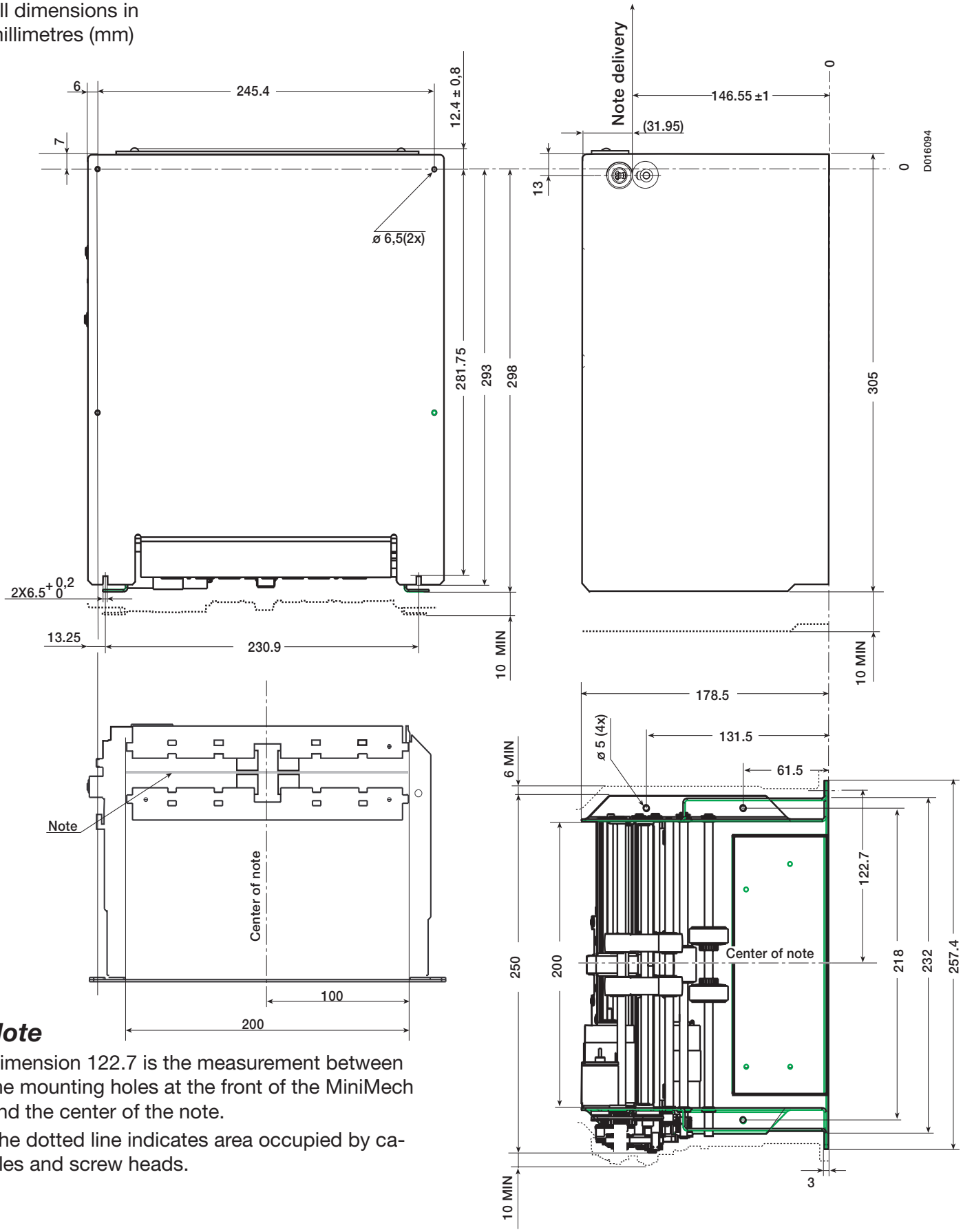
Relative Humidity

Operating	10 to 85%
Storage	5 to 95 %
Transport	5 to 95 %

dimensions

MiniMech dimensions

All dimensions in
millimetres (mm)



Note

Dimension 122.7 is the measurement between the mounting holes at the front of the MiniMech and the center of the note.

The dotted line indicates area occupied by cables and screw heads.

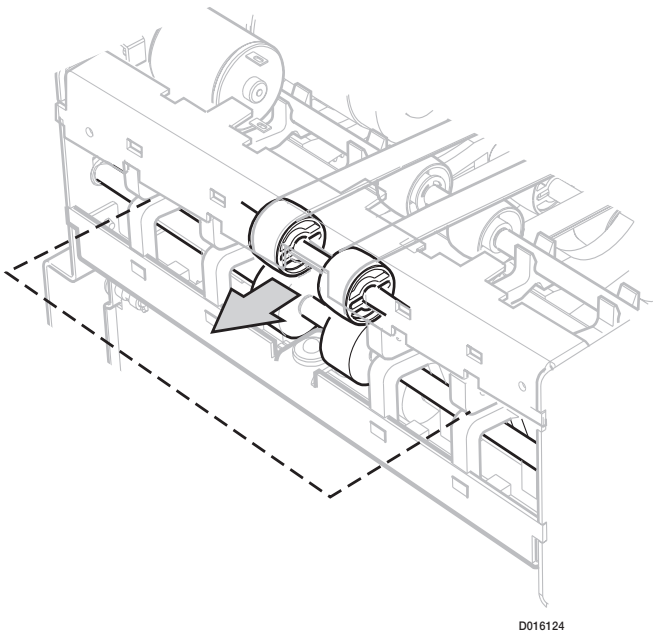
Delivery slot dimensions

The most important item when integrating the MiniMech into a cabinet is that the delivery slot of the MiniMech is correctly aligned to the slot in the cabinet.

If the MiniMech is moved out from and into the cabinet e.g. on slides, the delivery slots must always be aligned correctly when the MiniMech is pushed in. This could be achieved by using a docking device by adjusting the position of the MiniMech.

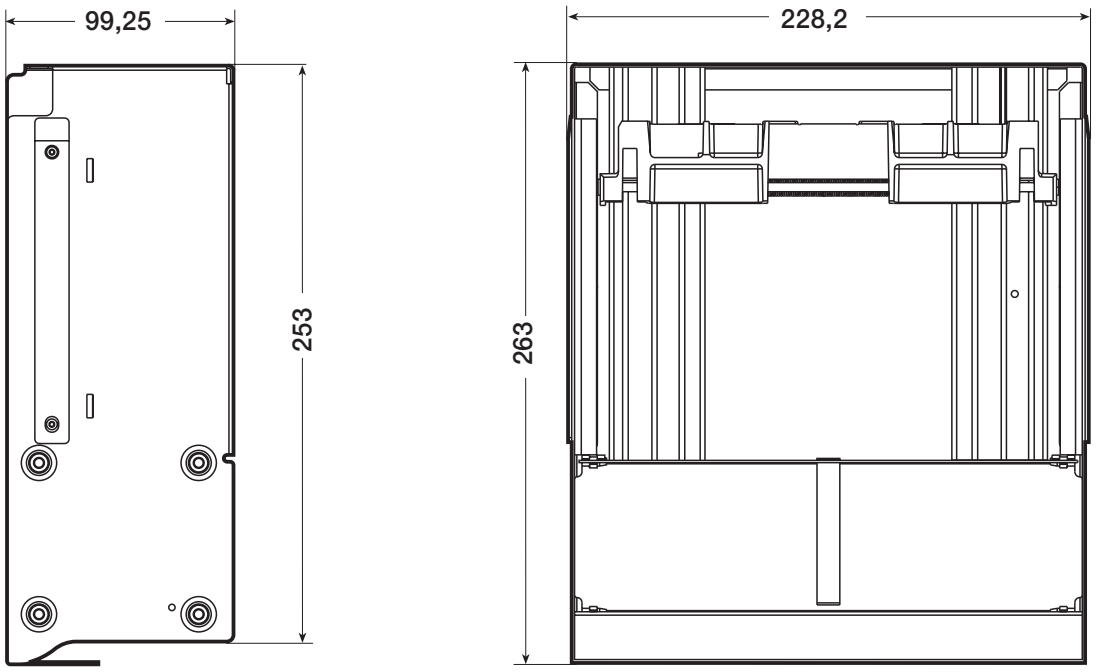
Note also the dimensions of the cabinet delivery slot and the distsance from the reference point to the bottom surface of the cabinet top plate.

- If the slot in the cabinet is too narrow, the notes may jam.
- If the distance between the cabinet and the MiniMech is too large, the notes may slip between cabinet and machine and miss the delivery slot.
- Depending on the wall thickness, the cabinet delivery slot may have to be chamfered to give access to the notes.



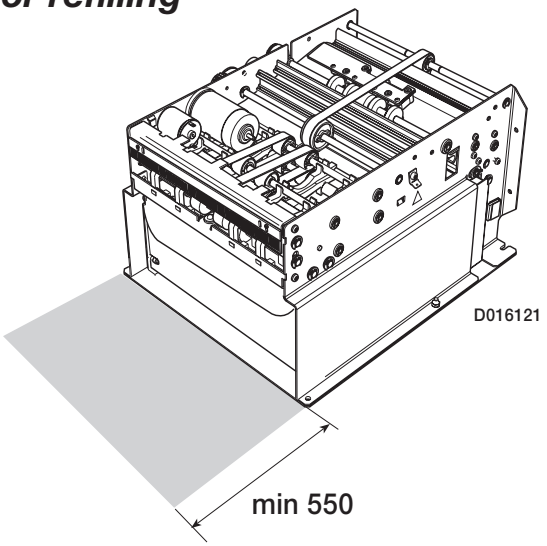
note & reject cassette dimensions

Note and Reject Cassette
NRC 010



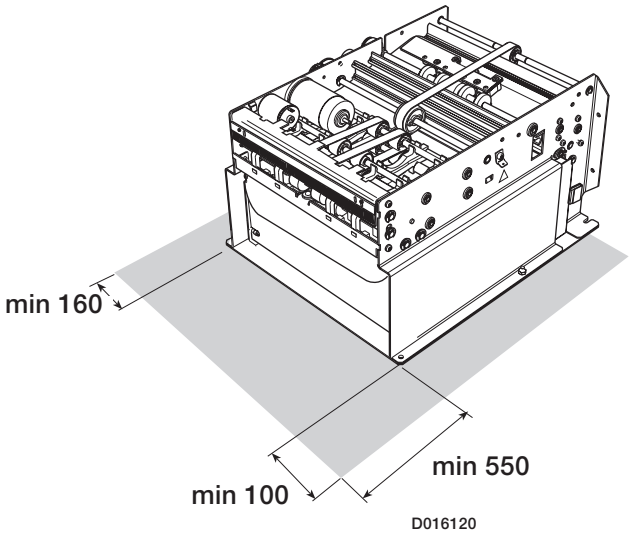
required space upon service and maintenance

For refilling



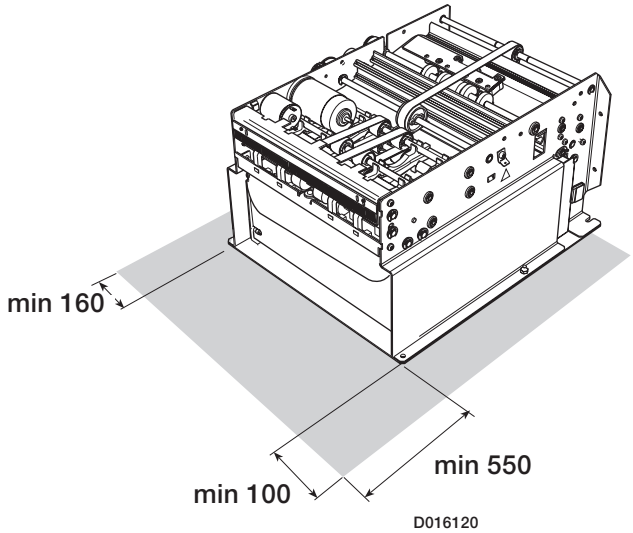
- The space in front of the MiniMech is required for removing and inserting the note compartment

For operator maintenance



- The space in front of the MiniMech is required for removing and inserting the note compartment
- The space beside the MiniMech is required for easy access to the rear of the MiniMech.

For service and maintenance



- The space around the MiniMech is required for commissioning of the MiniMech

connections

Note!

* Never connect the machine to anything else then +24 V +-10%.

* The Power Supply(DLRS or the ATM-ps) Must be switched off when the power connector of the MMC is fitted.

Power Connector

The power connector is of type AMP MTA 156-2.

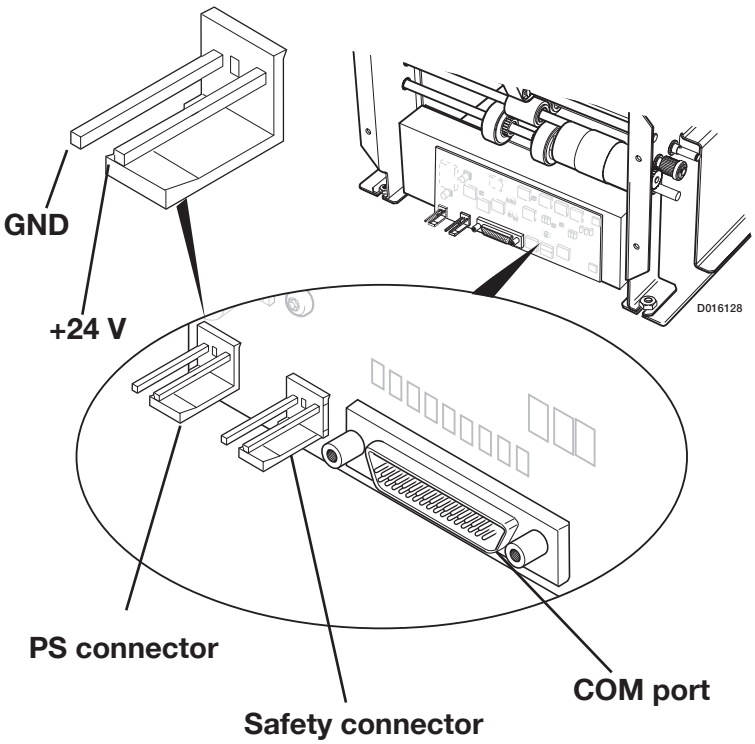
Connect PS to machine as shown.

ESD protection

Internal inter module connections and signal connections in modules must not be touched without measures taken for ESD protection.

Safety Switch Connector

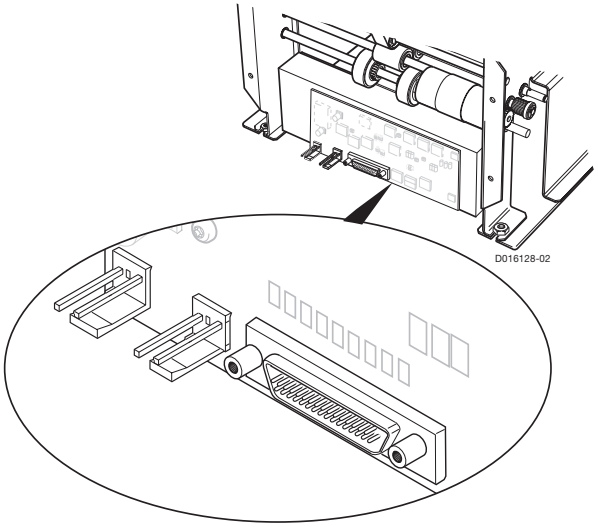
A safety switch connector is located on the Machine Controller and controls the current to the motors. It is recommended to connect the safety switch connector to a switch sensing the cabinet door position, should the door then be opened the MiniMech will not be operatable.



Communication connection

The communication connection is according to RS232 C standard, see description below.

Detailed information regarding communication, see section 6 in the Communication & Command Reference Manual (CCRM) for MiniMech Doc. No. 8030759



It is recommended that a filter connector is used in the cabinet if the communication line is threaded out of the cabinet holding the dispensing mechanism.

Talaris can offer a std RS-232 communication cable, P/N A008081, as an option.

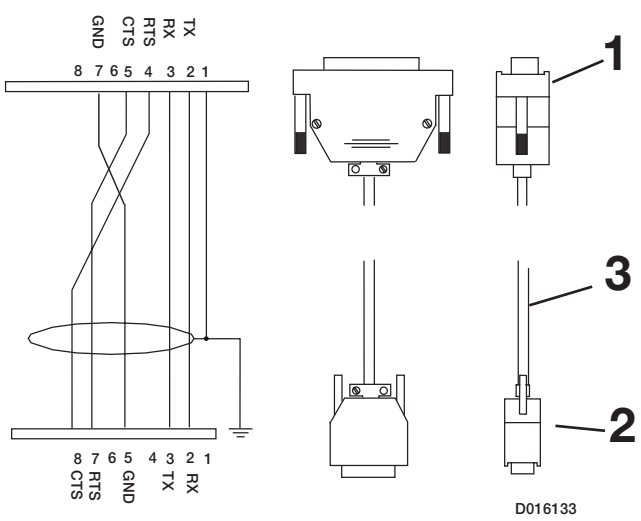
If it is prefered to use other communication cables, Talaris recommends the following:

1 Connector, D-SUB 25, AMP 748 051-1, shielded

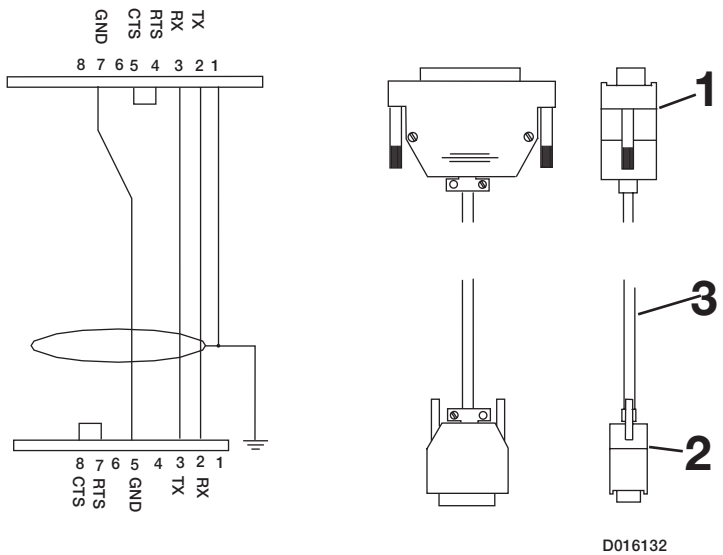
2 Connector, D-SUB 9, AMP 748 047-1, shielded

3 Cable, shielded

With handshaking



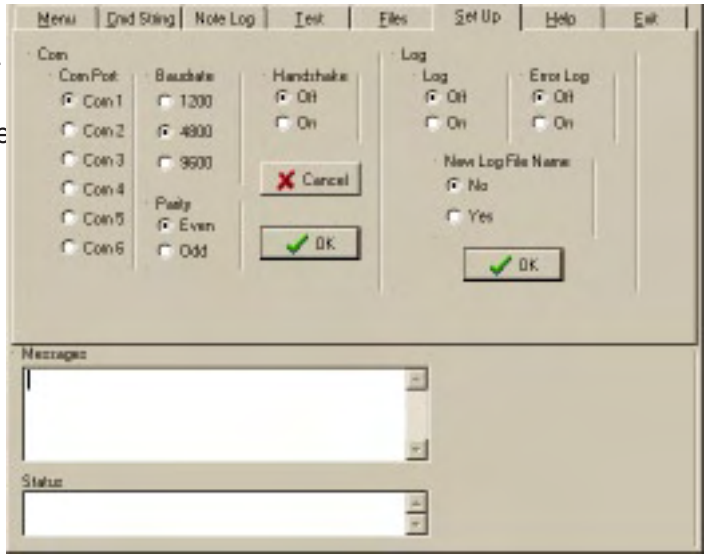
Without handshaking



Setup

Start the test program and set the appropriate communication settings in the Set Up tab. Make sure all settings matches the hardware configurations on the machine and communications cable.

The image shows the default settings.



Dispensing

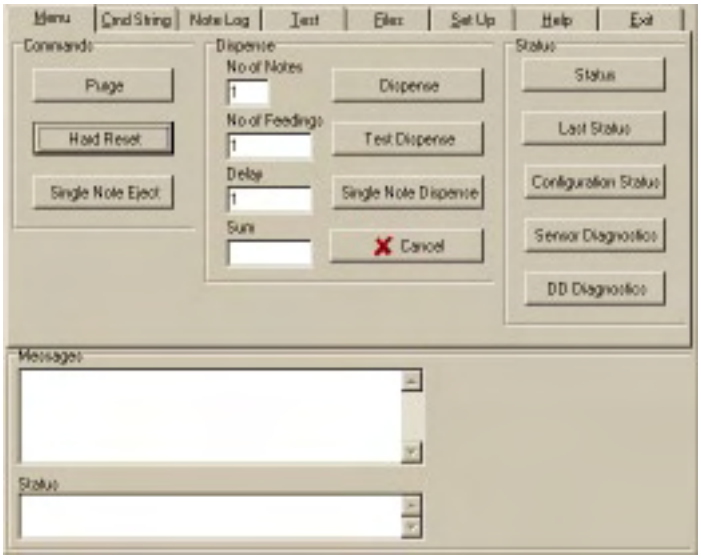
To operate the MiniMech, the following commands are normally needed.

Purge - Starts the main motor and clears the note path.

Dispense - Dispenses the number of notes typed in the dispense box - maximum allowed is x notes.

Single Note Dispense - Dispenses 1 note which will remain in the outlet - must be followed by a Single Note Eject.

Single Note Eject - Ejects the note that has been dispensed to the outlet with the Single Note Dispense command.



Learning Notes

Required before commissioning
The learning notes mode is activated the very first time the machine is booted or with software command WD/392/0.

. Make sure the notes in the note tray are of adequate quality.
. Make sure the reject compartment tray is empty.

In FW rev.1-3

. Issue a dispense command with one note as an argument.

In FW rev.4

. Issue Dispense or Test dispense with one note as an argument.

The machine will now feed six notes. If the command is issued as a Dispense, five of them will be rejected and one note will be dispensed. If the command was a Test Dispense, all notes will be rejected.

Verify there are five notes in the reject compartment and one note dispensed if the command was a dispense. Verify there are six notes in the reject compartment and no notes dispensed if the command was Test Dispense.

If the number of notes rejected and dispensed are correct according to above, the learning notes sequence was successful. If not go back and put the machine in learning notes mode and perform a new Leaning-notes sequence.

Please refer to CCRM, Doc No 8030759.

Clearing NQ data table

Whenever changing denomination it is required to clear the NQ data table. The NQ data table keeps information of the denomination previously processed through the machine, and this has been achieved through a learning procedure. A learning procedure is performed when the NQ data table is empty, and is done by picking 5 notes from the NRC 010. The NQ reads the size and thickness of the note and sends the information to the machine controller where it is stored in the non-volatile RAM. All 5 notes goe to reject.

Clearing NQ data table with MM Test SW

Start the MM Test SW. Make sure it can communicate with MM010 by issuing a Purge or another command that will reply.Type WD/392/0 from the Cmd Str tab in MM Test, in the Command box and push the Send button.

It is possible to read out width and thickness of the denomination learned by the MM010 from FW version 2001.01.01. If the reply is 0000000000000000000, the NQ data table is empty.

Clearing NQ data table with jumper JP2 on MC

There are 2 jumpers located on the Machine Controller. JP2 is for clearing the NQ data table as shown.

Switch off the MM010 and place, or remove, the jumper on JP2. Switch on the MM010. If the status of JP2 is changed from closed to open, or vice versa, the machine will empty the NQ data table. This means that there is no default position for the jumper so leaving the jumper in one or another position will not clear the NQ data table - it is the status change that clears the NQ data table.

From version 2001-01.01 all 3 LED's on the Machine Controller will flash rapidly if there is no information in the NQ data table.

NOTE!

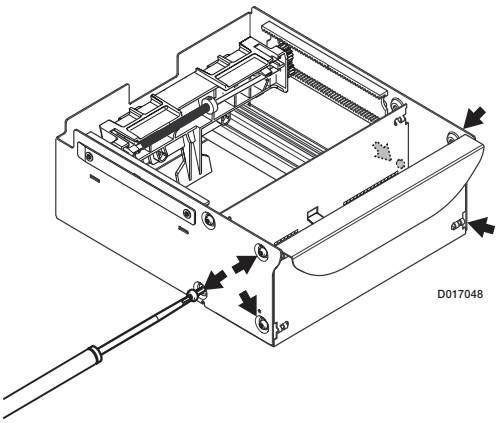
JP1 is for enabling the possibility to change communication settings such as baudrate and parity with a WD items 115 (baudrate) and 116 (parity), therefore, placing the jumper on JP1 will not harm the machine, but the NQ data table will not be cleared and the machine will after power-up operate with the settings from items 115 and 116, and it will not be possible to communicate with the machine with communication settings prior to the change. With no jumper on JP1 the machine will operate with default settings baudrate 4800 and Even parity.

Always remember to check that the NQ data table is cleared and also perform the learning note procedure to verify it has been performed successfully.

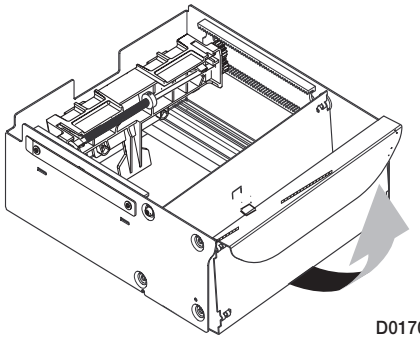
NRC 010 settings

Removal of note guides

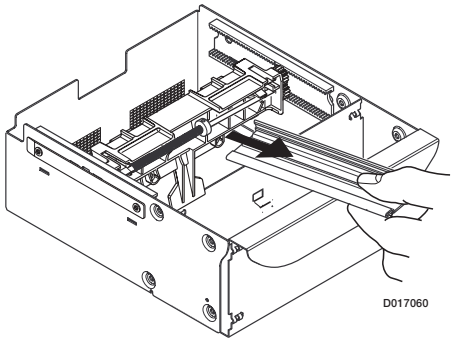
- Loosen and remove six screws on each side of the cassett according to the illustration.



- Pull the reject box slightly backwards according to the illustration.

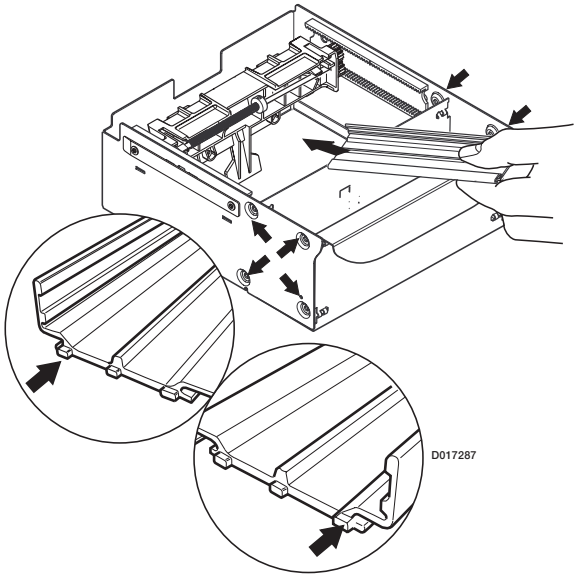


- Lift out the note guides as shown.

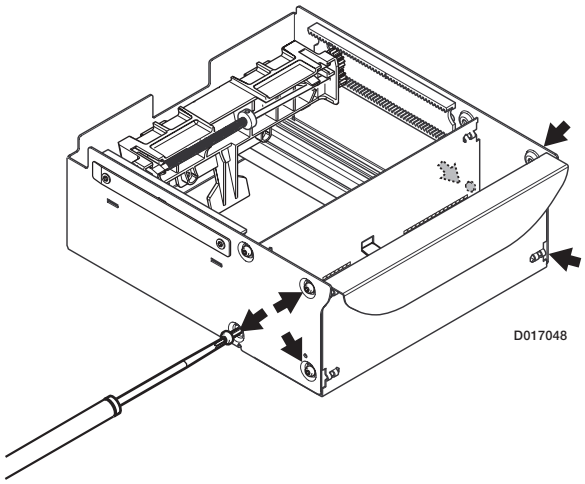


Fitting of note guides

- Refit the note guides according to table on page17. Use the marked pins as a reference when refitting the guides into the matrix.



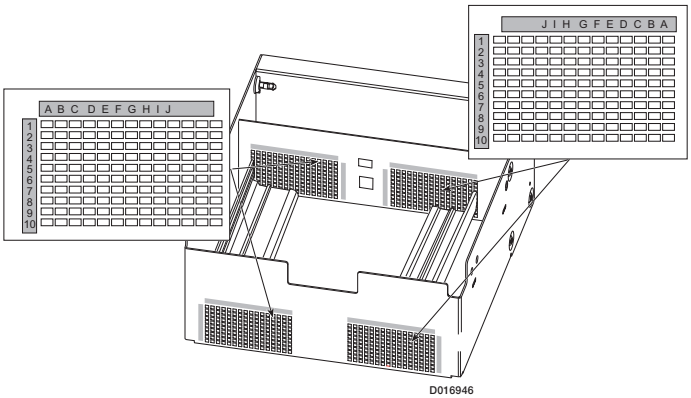
- Push reject box back into place and tighten the six screws.



Note table

Follow the table for note width and note length to see in which position to fit the note guides.

Tables for adjustment



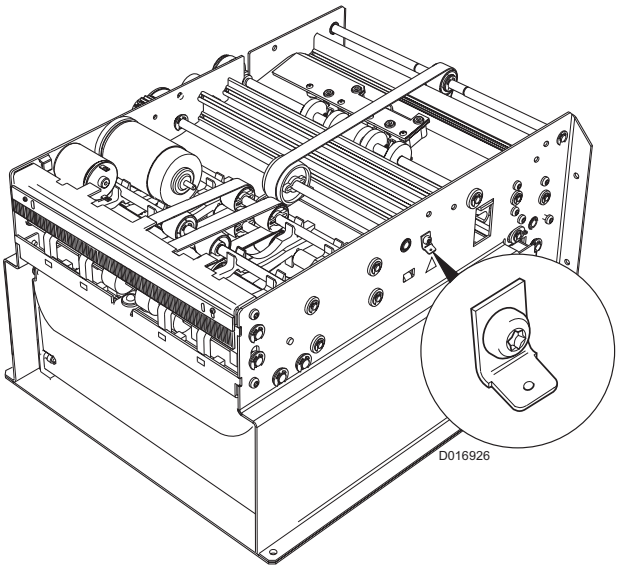
Note height (mm)		Adjustment
From	To	Position
55	57	1
58	60	2
61	63	3
64	66	4
67	69	5
70	72	6
73	75	7
76	78	8
79	81	9
82	84	10

Note width (mm)		Adjustment	
From	To	Position left	Position right
108	111	J	J
112	115	J	I
116	119	I	I
120	123	I	H
124	127	H	H
128	131	H	G
132	135	G	G
136	139	G	F
140	143	F	F
144	147	F	E
148	151	E	E
152	155	E	D
156	159	D	D
160	163	D	C
164	167	C	C
168	171	C	B
172	175	B	B
176	179	B	A
180	183	A	A

safety requirements

External interconnection
Interconnecting cables and cable assemblies used for external interconnection between parts of equipment or between components

Chassis GND
The machine chassis needs to be connected to GND due to EMC levels. The GND connection can be made either on one of the six fastening points on the bottom plate or with a separate cable from the connector on the sideplate. (See illustration).



Power Supply
External Power Supply must be Limited Power Source with SELV output.

The Talaris Commitment

Talaris are World Experts in cash management. Across the globe 2,300 personnel, with over 130 business partners deliver technology and solutions that provide security, productivity and innovation to our customers.

The company is committed to the highest ethical standards and compliance with legislation and to be a fair employer wherever we operate. As a responsible organisation we maintain a disciplined approach to our corporate governance and operate to the optimum professional standards in all aspects of our business.

Talaris will always seek to provide a safe and productive work environment where all employees can grow and be challenged. Wherever we operate our objective is to contribute actively to the community and the local environment. An intrinsic part of our business philosophy across our product and service offerings is to be consistently environmentally responsible and to continue to improve our performance across all environmental issues wherever possible.

talaris™
security | productivity | innovation

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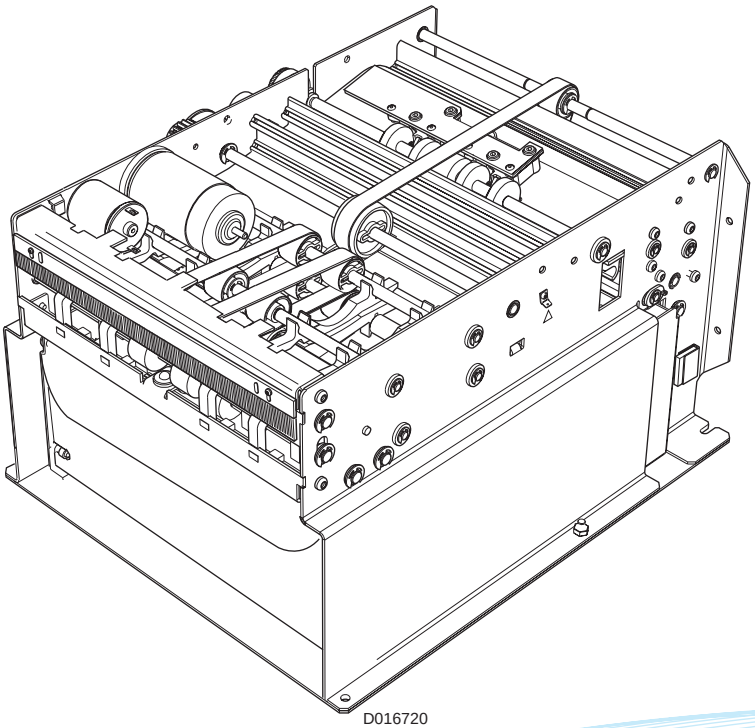
MiniMech

Users Manual



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2009-06-04

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Preface

MiniMech is a product made by Talaris Cash Dispensing AB. This user handling covers description, instructions and information necessary for handling the MiniMech in the correct way.

Talaris Cash Dispensing AB Flen, Sweden

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Safety warning

Obligations of the user

- Everyone working with the machine must read this manual.
- Observe the safety instructions and warning labels.
- Talaris or its representative should replace damaged safety devices such as fuses and warning labels immediately.

	ATTENTION
	The indication ATTENTION warns of the danger of minor physical injury or damage to equipment.
	ATTENTION
	Electrostatic sensitive device. Observe ESD precautions before handling.
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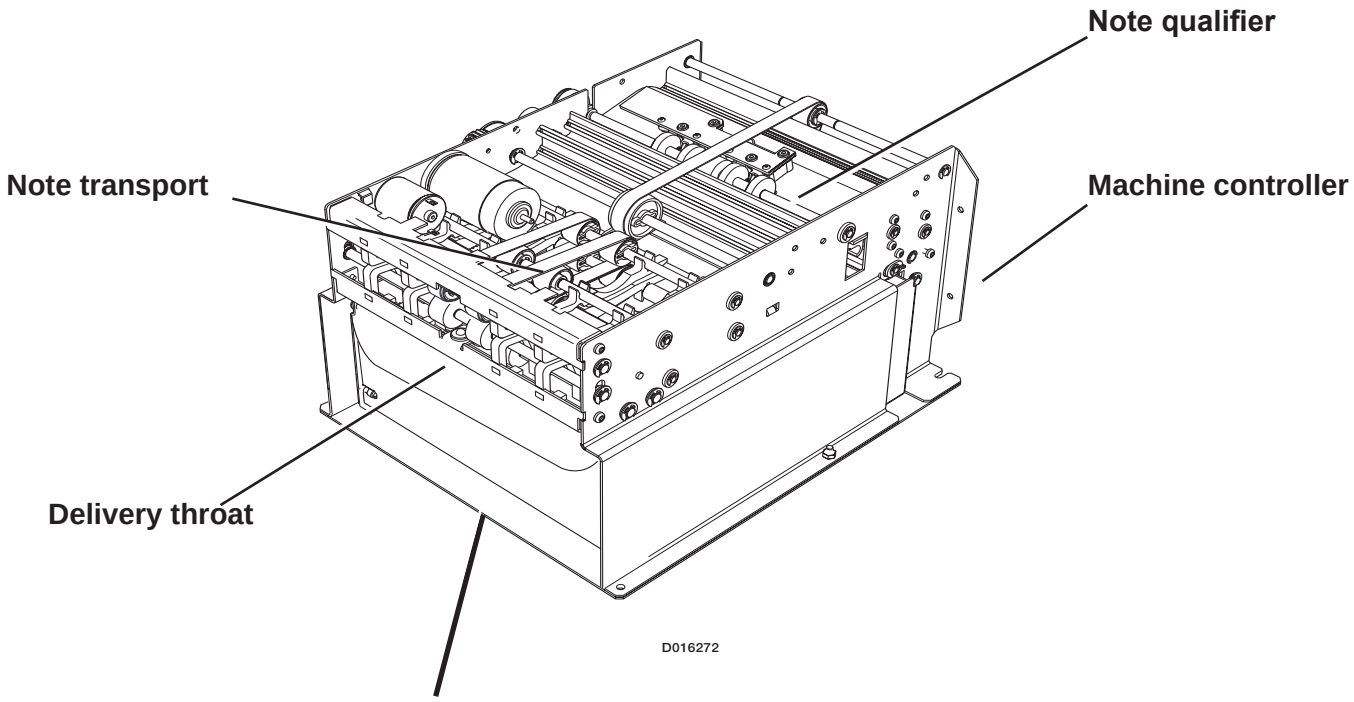
	The indication WARNING warns you of the danger of serious physical injury
	DANGER TO HANDS:
	The indication warns of possible injuries to the hands. Remember, to take extra care when cover plates have been removed. Beware of fast moving mechanical parts especially when cover plates are removed Always replace cover plates after completing work. To avoid injury, use the following precautions: Always hold the modules on the handling points, marked in green. Close carefully the safe door and covers.
	ELECTRIC SHOCKS
	The indication warns of possible injuries through electrical voltages. Improper work on the electrical components can lead to life threatening injuries from electric shocks! Unprofessional handling or incorrect connections can result in the machine no longer being safe for operation. <u>Electrical work shall only be performed by qualified personnel (electricians)!</u> Remember, to take extra care when cover plates have been removed, units disconnected, or circuit boards unplugged. The power supply contains unswitched line voltage. Never leave a part-serviced machine connected when unattended. When connecting the equipment to a 240V AC supply in the United States and Canada, it is necessary to connect via a double pole 20A circuit protector.
	WARNING:
	• Due to the nature of his work, an operator or service technician may have to bypass normal safety interlocks and features to carry out some of the instructions in this manual. • Always restore safety interlocks after completing work. • At any risk or danger, disconnect the mains cable at the rear of the machine from the mains outlet. • CAUTION; Please note that if the machine contain Lithium Batteries there is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

Overview

Notes dispenser (MiniMech)

MiniMech is a small single note dispenser machine.

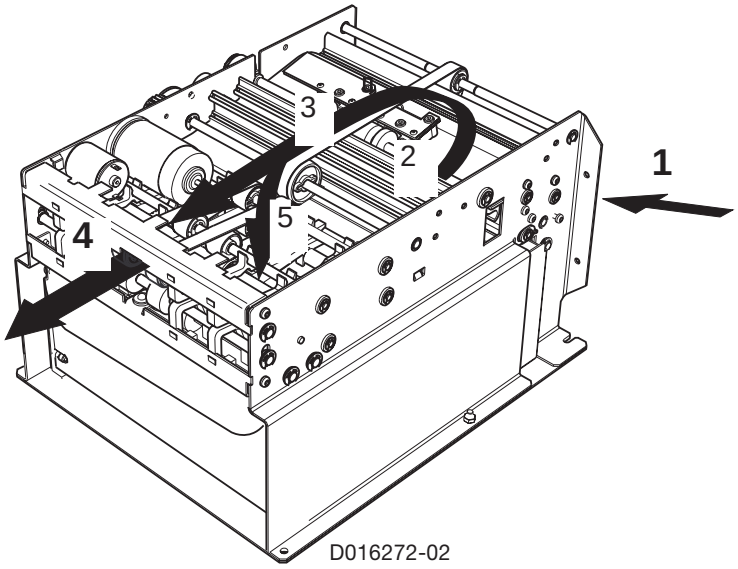
The MiniMech consists of the following main parts:



Note & reject tray, NRC 010
Box where the notes are kept before dispensing and collected if they are rejected.

Introduction

Function



1 Message to the MiniMech

A request to dispense is made. It is then transmitted as a message to the machine controller in the Mini-Mech. This message describes the number of notes to be dispensed.

2 Notes up from the tray

The MiniMech counts the required number of notes and feeds them to the note qualifier.

3 Note qualifier

The note qualifier measures the notes and feeds them into the note transport. Incorrect notes will be rejected into the reject compartment in the NRC 010.

4 Notes to reject

When the tests indicate no error the notes are delivered to the Delivery Throat.

5 Notes counts and tests

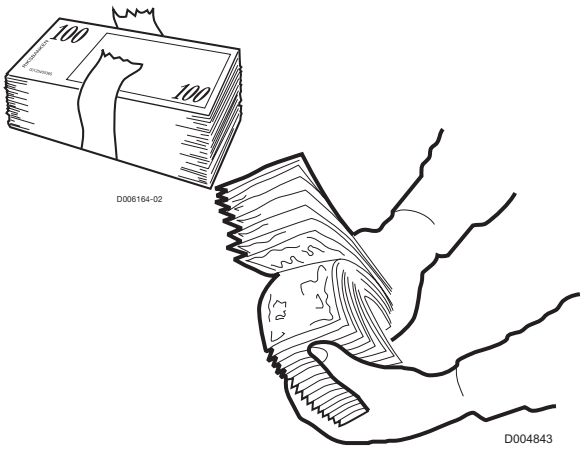
The notes are counted a second time and checked for incorrect note feedings when being passed through the note outlet.
If this test indicates an error, the MiniMech is stopped immediately for clearing of the note transport mechanism.
If any test indicates an error, the faulty note will be transported to the reject and an extra note is fed from the cassette part of the NRC 010.

Loading Notes and unloading notes

Preparing notes

The number of rejects depends directly on the loading procedure and the quality of the notes. Store the notes at room temperature for at least eight hours before feeding from trays. The following procedures are recommended to aid easier note feeding from trays. Without preparation, feeding problems may occur, such as a higher reject rate or jams in the transport path.

New, unused notes

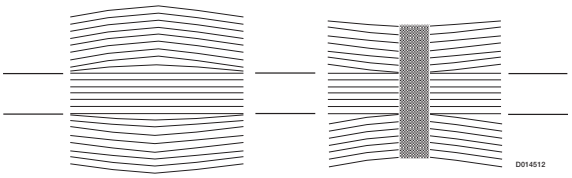


- Remove the band around each bundle of notes.
- Separate the notes from each other by:
- Strike the bundle hard against the edge of a table or similar object.
- Flip through each bundle of notes in both directions at both ends.

  or
- Using a note counter, select notes from the centre of the bundle. The notes in the centre are normally flat, notes in the ends of the bundle are often cupped.

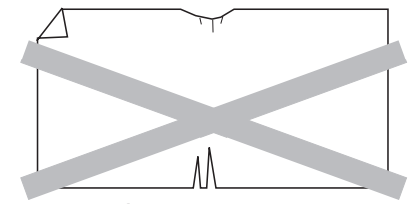
Unacceptable notes

Notes with the following irregularities are liable to cause feeding problems:

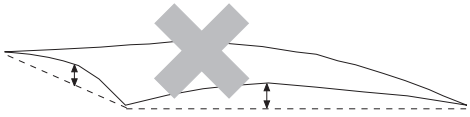


Dog-eared, strapping damage

- Joined by any means
- Having staples or pins
- Sticky surfaces
- Repaired with tape
- Torn, with tears exceeding 5 mm or with centre edged tears
- Having holes or missing sections
- Crumpled or crisp and crinckled
- Dog-eared, with a folded edge exceeding 5 mm
- Limp or moist
- Concave or deformed by prolonged storage
- Having strapping damage
- Combination of new and used notes in the same cassette may cause higher reject rates



Center edge tears

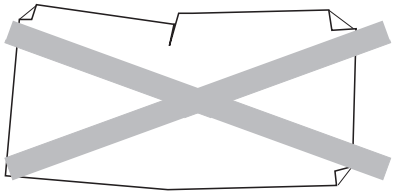


Concave notes 5 mm or more

Used notes

Used Notes must not be limp and should be reasonably clean.

- Remove the band around each
- Remove foreign objects, e.g. pins,
- Remove torn or very worn notes.
- Straighten any folded notes.

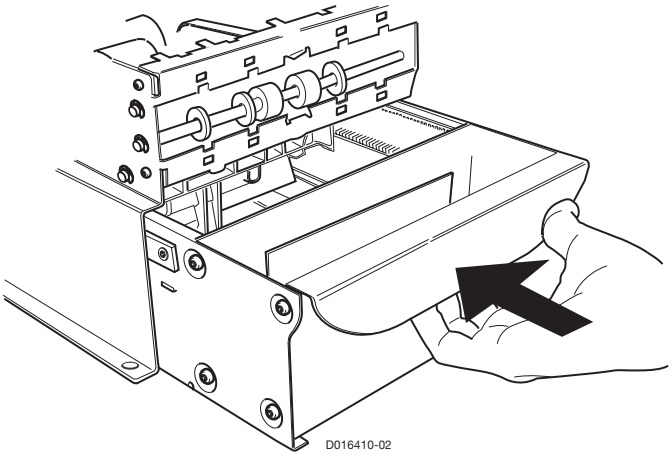


Crumpled notes D014511

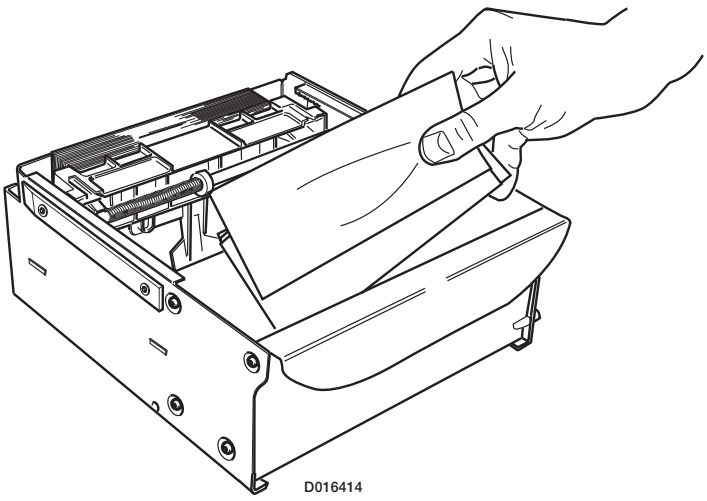
Removal of NRC 010 and collecting rejected notes

The NRC 010 is not locked and can be removed at any time when the machine is not in use.
Before removing of the NRC 010, use the appropriate command from the host, driver or application. If the tray should be removed while the MiniMech is in use the MiniMech will malfunction.

1. Remove the NRC 010

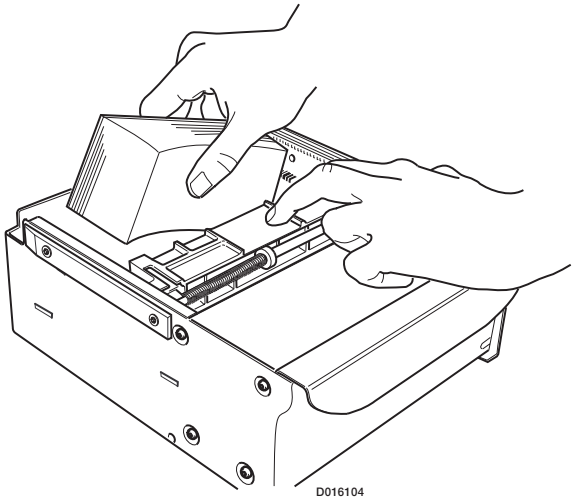


2. Use the handle and slide the tray out.
Collect rejected notes from the reject compartment part of the NRC 010 as shown.



Loading and unloading the notes

Load only notes of the correct denomination into the NRC 010.

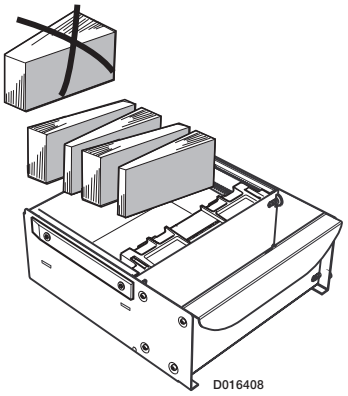


1. Move the pusher plate

The pusher plate has to be moved to give space for the notes between the pusher plate and the feed opening. Pull the pusher plate towards the NRC 010 handle.

2. Prepare and load the notes

WARNING
Notes are sometimes thicker in certain parts. They can also be cupped in the bundle. If the notes are turned the same way, the pile will be unequal and the notes will be difficult to dispense.

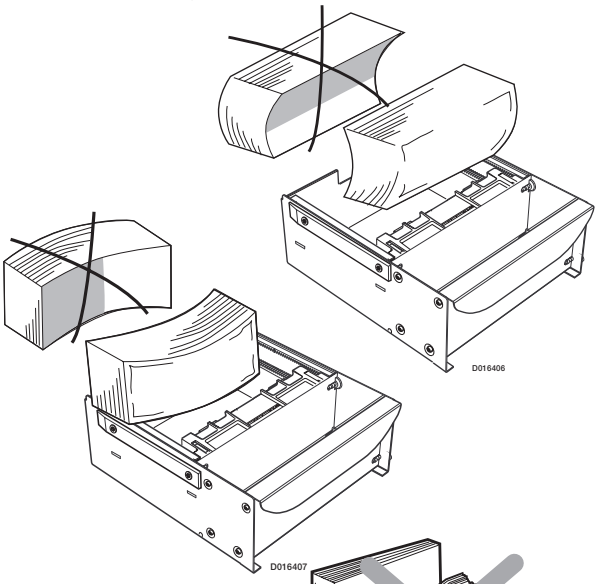


Slanting pile

- To avoid dispensing problems caused by a slanting pile, put the notes in neat bundles of 100-200 notes.
- Turn every other bundle to face the other way to make the pile the same height at both sides.

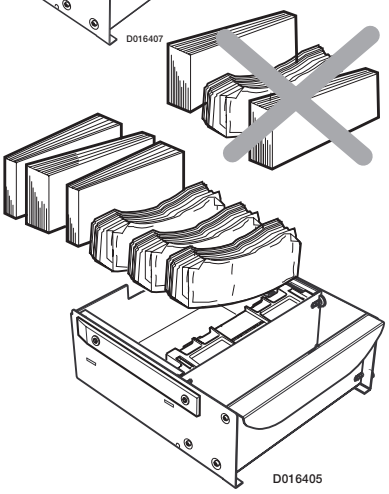
Concave bundle

- To avoid dispensing problems caused by cupped bundles, turn all the bundles with the cupped side towards the dispense opening.
  It will make dispensing of notes from the NRC 010 easier.



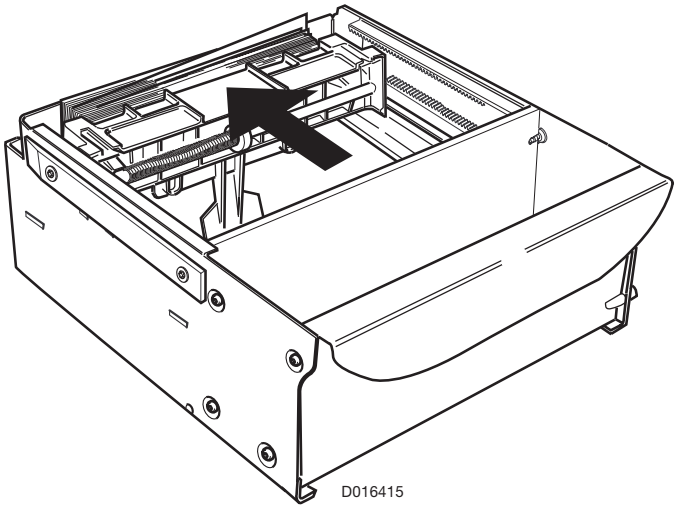
Mixed slanting and concave bundles

- To avoid dispensing problems caused by a slanting and cupped bundles, put the notes in neat bundles of 100-200 notes.
- Place the prepared bundles with the cupped side nearest and towards the dispense opening.
- Turn every other bundle to face the other way to make the pile the same height at both sides, as shown.
  It will make dispensing of notes from the NRC 010 easier.
- Always place the bundles containing old notes into the cassette first and bundles containing new notes last.



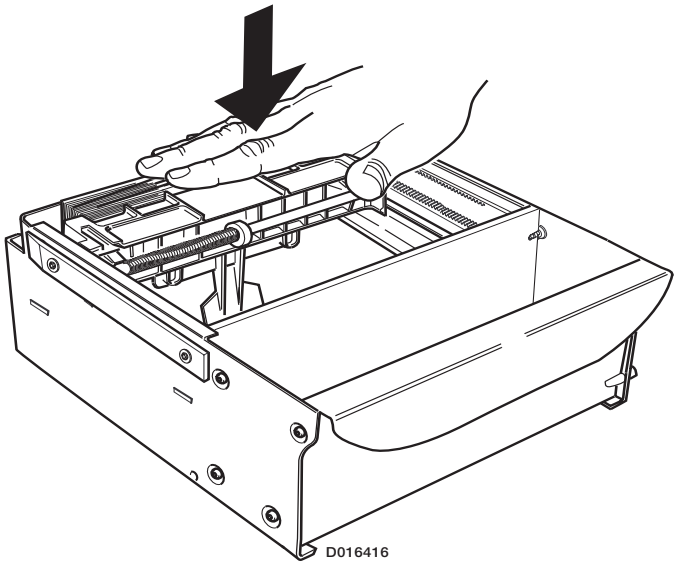
3. Release the pusher plate

Release the pusher plate towards the note pile.



4. Level the note pile

Compress the note pile slightly by hand. Single notes must not protrude from the bundle.

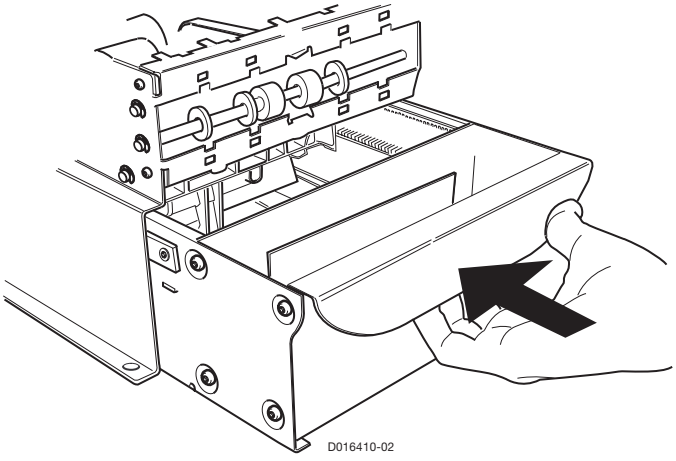


NOTE
When loading the NRC 010 full, make sure that the pusher plate has a leeway of approx. 5 mm between the wall plate and the pusher plate

5. Insert the NRC 010

Using the handle, slide the NRC 010 into the machine. Make sure the NRC 010 is fully inserted.

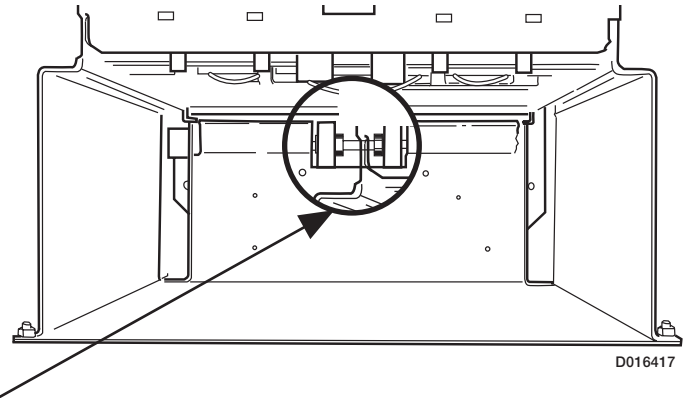
The MiniMech is now ready to execute commands from host or application.



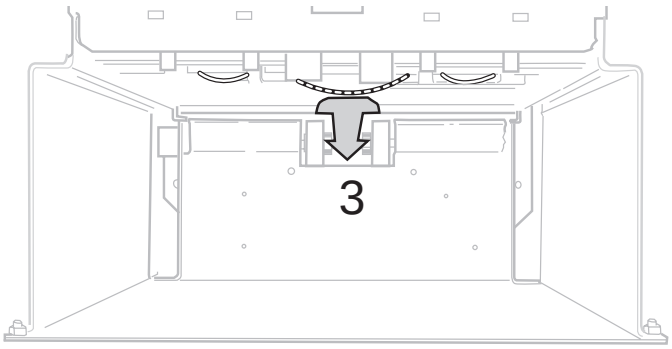
Trouble shooting

1. **Remove NRC 010**
   See page 8

IMPORTANT
Always switch the power OFF before clearing jams. All notes removed from the mechanism must be handled according to local procedures.

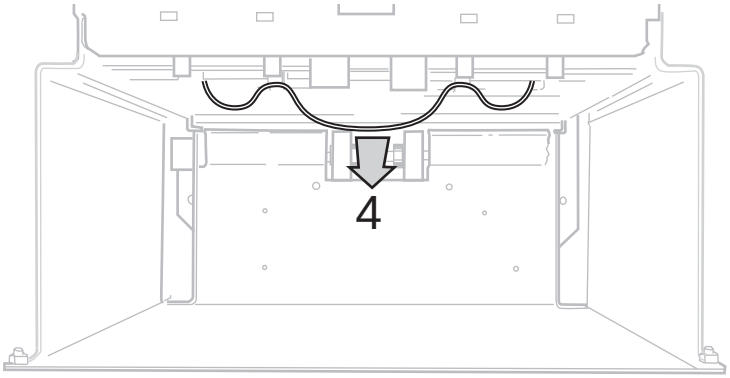

D016417

2. **Remove notes in the note inlet area**
   Inspect the note inlet area and remove any jammed notes.



D016418

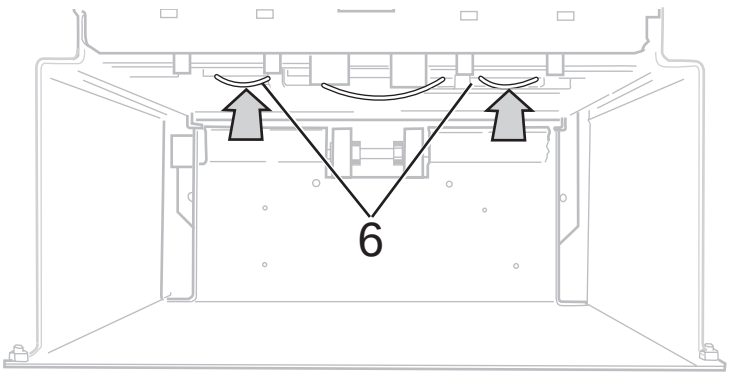
3. **Release the note qualifier lid**
   Release the yellow handle inside the upper most NRC 010 compartment by pulling it down.



D016419

4. **Open the note qualifier lid**
   Fold the lid down by pulling the yellow handle.

5. **Remove all jammed notes**

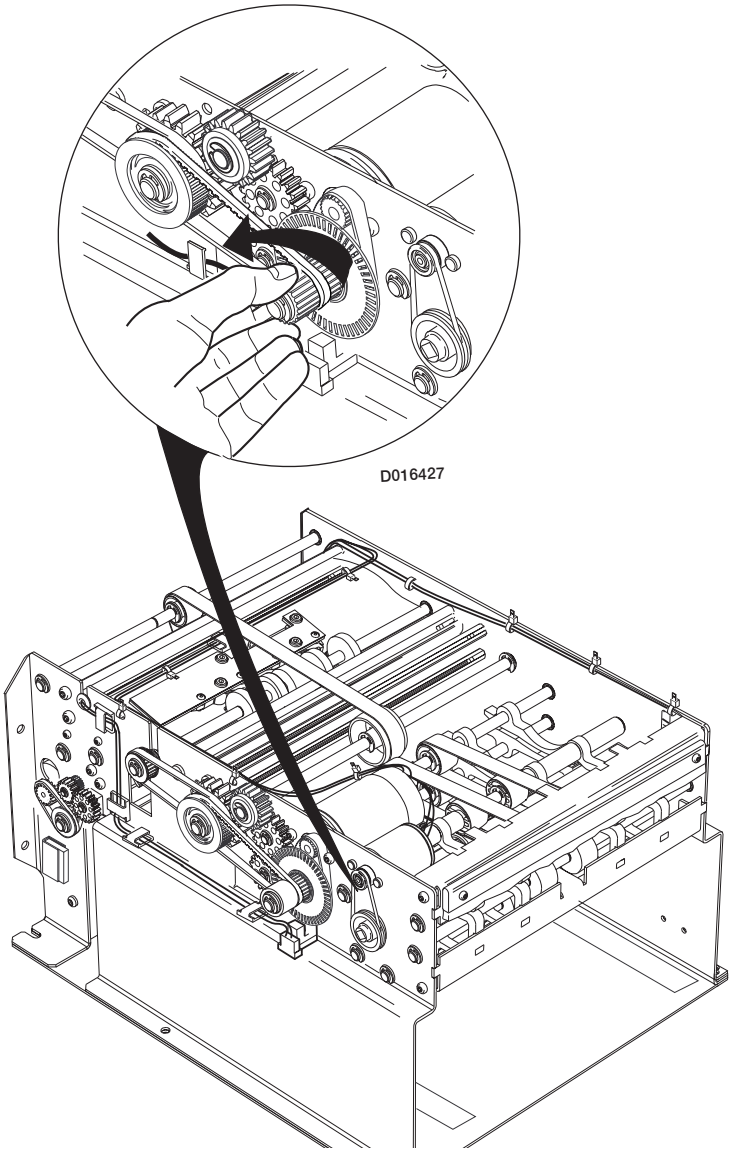


D016420

6. **Close the note qualifier lid**
   Make sure that you close the lid properly and fasten the yellow handle at both ends.

Clearing note jam

7. Remove all visible jammed notes in the note transport by turning the cog-wheel counter clockwise as shown.



If the trouble still remains, call for service.

The Talaris Commitment

Talaris are World Experts in cash management. Across the globe 2,300 personnel, with over 130 business partners deliver technology and solutions that provide security, productivity and innovation to our customers.

The company is committed to the highest ethical standards and compliance with legislation and to be a fair employer wherever we operate. As a responsible organisation we maintain a disciplined approach to our corporate governance and operate to the optimum professional standards in all aspects of our business.

Talaris will always seek to provide a safe and productive work environment where all employees can grow and be challenged. Wherever we operate our objective is to contribute actively to the community and the local environment. An intrinsic part of our business philosophy across our product and service offerings is to be consistently environmentally responsible and to continue to improve our performance across all environmental issues wherever possible.

talaris™
security | productivity | innovation

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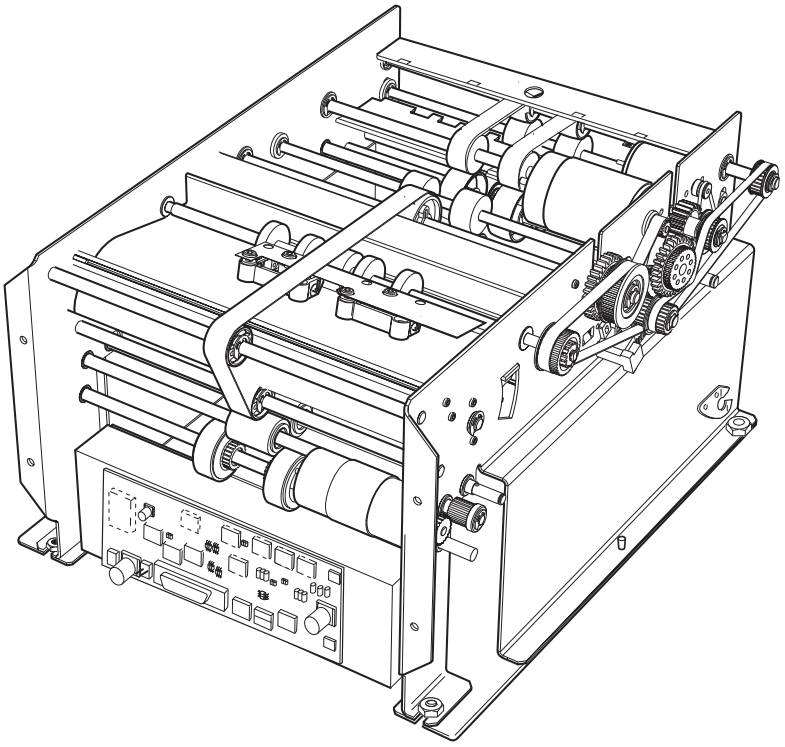
MiniMech 010

Service Manual



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Doc. No. 8030760/02-EN
Date: 2009-07-08

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Preface

This manual is a guide on how to service the Talaris MiniMech.

The manual is not intended to be self-instructing.
The service engineer must have proper training before using this manual.

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Obligations of the user

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	The indication warns of possible injuries to the hands. Remember, to take extra care when cover plates have been removed. Beware of fast moving mechanical parts especially when cover plates are removed. Always replace cover plates after completing work. To avoid injury, use the following precautions: Always hold the modules on the handling points, marked in green. Close carefully the safe door and covers.
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	The indication warns of possible injuries through electrical voltages. Improper work on the electrical components can lead to life threatening injuries from electric shocks! Unprofessional handling or incorrect connections can result in the machine no longer being safe for operation. <u>Electrical work shall only be performed by qualified personnel (electricians)!</u> Remember, to take extra care when cover plates have been removed, units disconnected, or circuit boards unplugged. The power supply contains unswitched line voltage. Never leave a part-serviced machine connected when unattended. When connecting the equipment to a 240V AC supply in the United States and Canada, it is necessary to connect via a double pole 20A circuit protector.
	WARNING:
	Due to the nature of his work, an operator or service technician may have to bypass normal safety interlocks and features to carry out some of the instructions in this manual. Always restore safety interlocks after completing work. At any risk or danger, disconnect the mains cable at the rear of the machine from the mains outlet. CAUTION; Please note that if the machine contain Lithium Batteries there is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

General

This document is a service manual for the MM 010.
The document is intended for use as:

- Workshop repair instruction

⚠	**IMPORTANT:**
	Always use ESD-protection when servicing electronic parts in the MM 010. When changing circuit boards, make sure that the program has the right revision. CAUTION; When power has been switched off, always wait at least 15 seconds before switching the power on again, to make certain the machine will initialize properly.

	NOTE:
	The mechanism must not be lubricated if not specified in maintenance instruction or other technical document. Oil and grease are not recommended. Paper dust particles will remove oil from unsealed bearings and grease attracts dust.

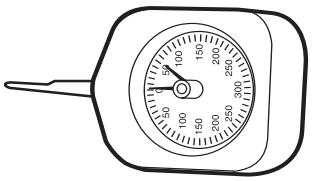
Faulty Modules:

On occasions there are changes in repair methods criteria. Normally, information on the changes are distributed, but if you are in doubt, contact Talaris Technical Support.

Tools

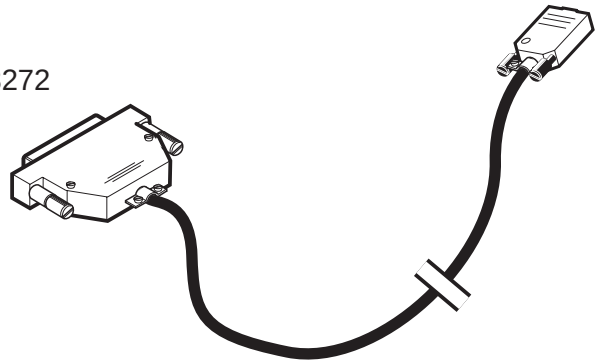
Standard engineering service tools are required

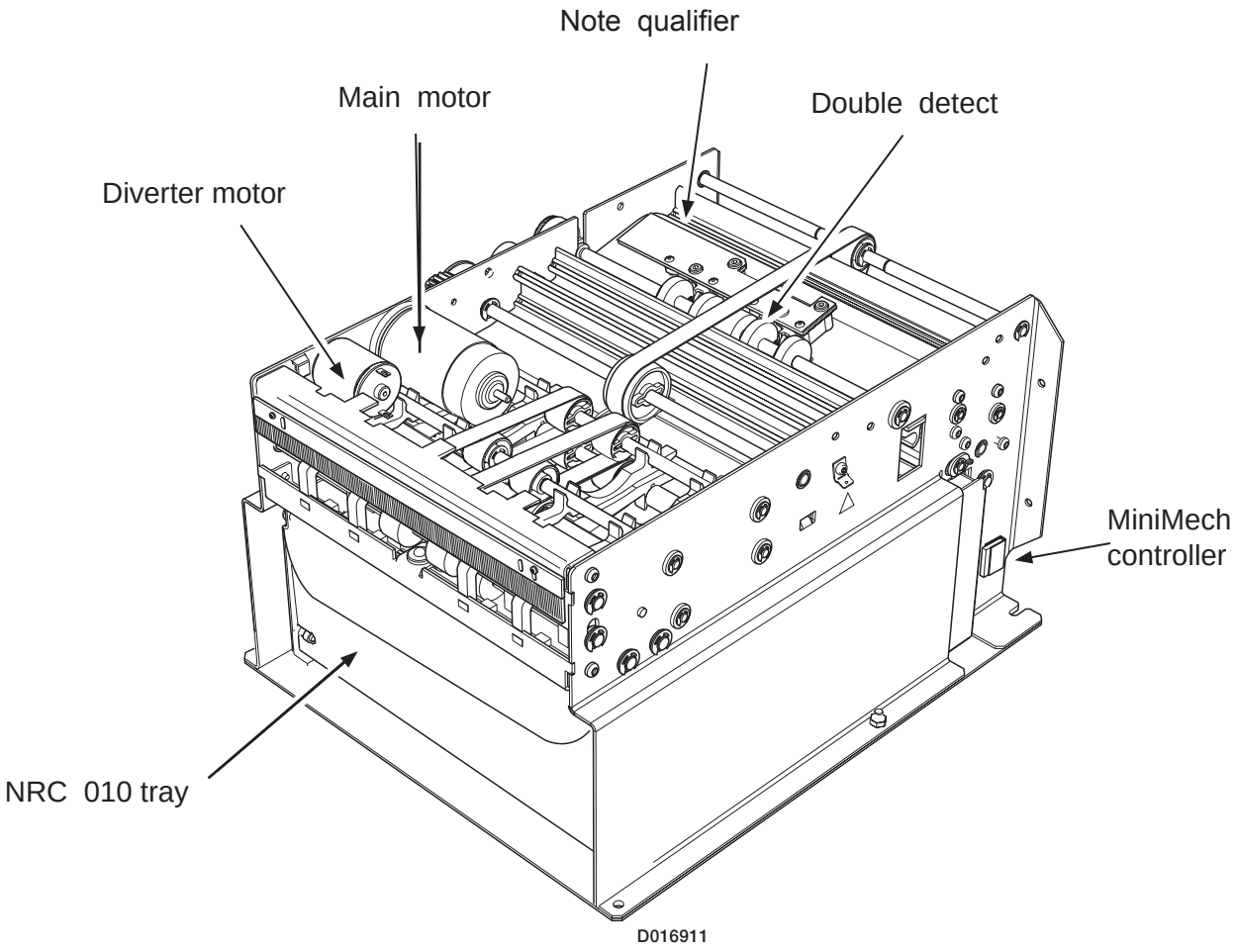
Cleaning equipment
- soft brush
- cloth

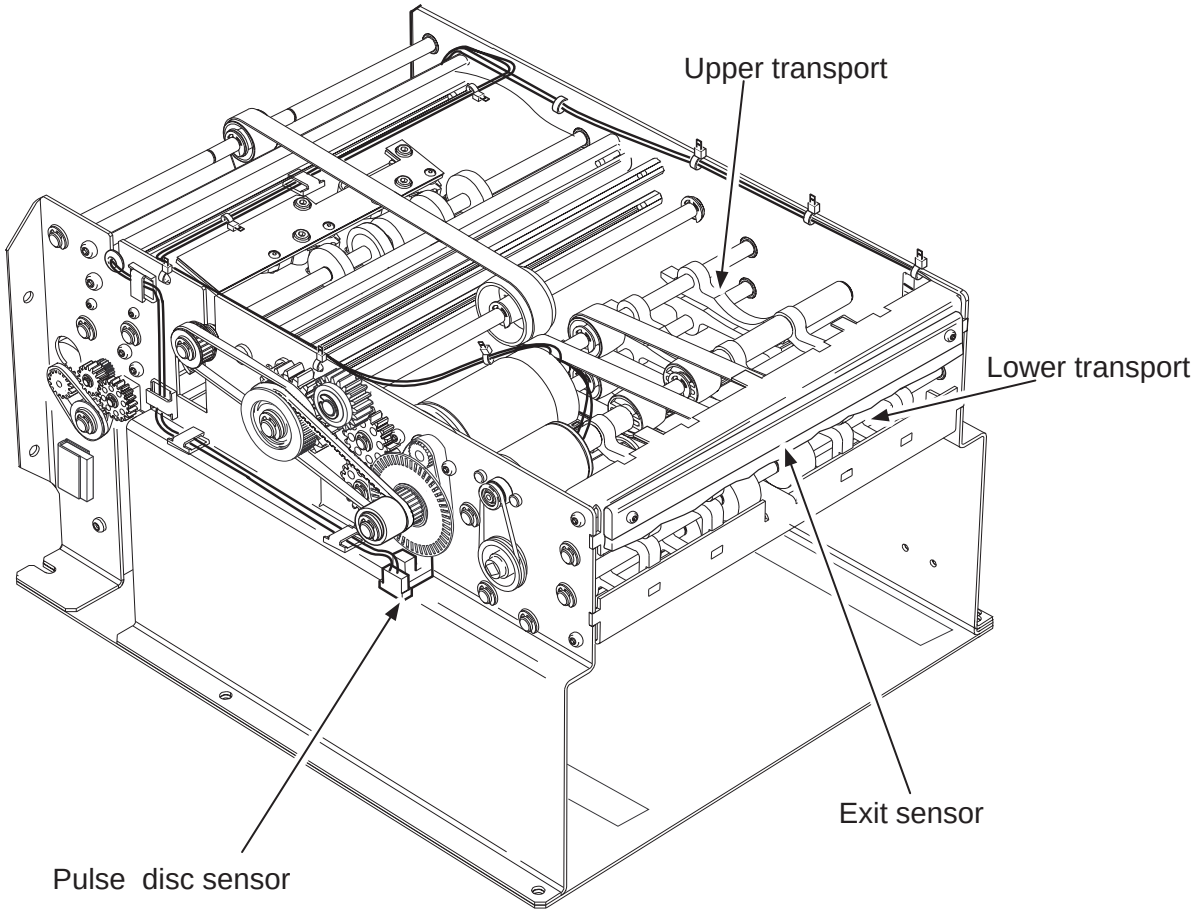


Special tools required for control of MM 010

- Spring tension measurement tool P/N A007123
- PC, IBM-compatible with com. cable A008081
- Service program MiniMech test program P/N A008272




Note qualifier
Main motor
Double detect
Diverter motor
MiniMech
controller
NRC 010 tray
D016911

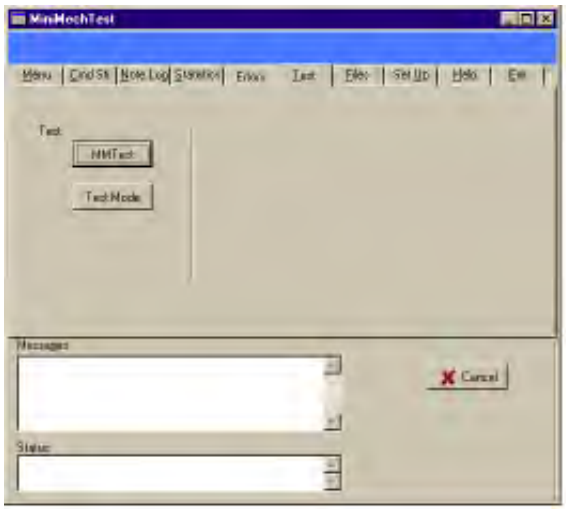

Upper transport
Lower transport
Exit sensor
Pulse disc sensor
D016425

Control of machine parameters

1. **Start the program.**

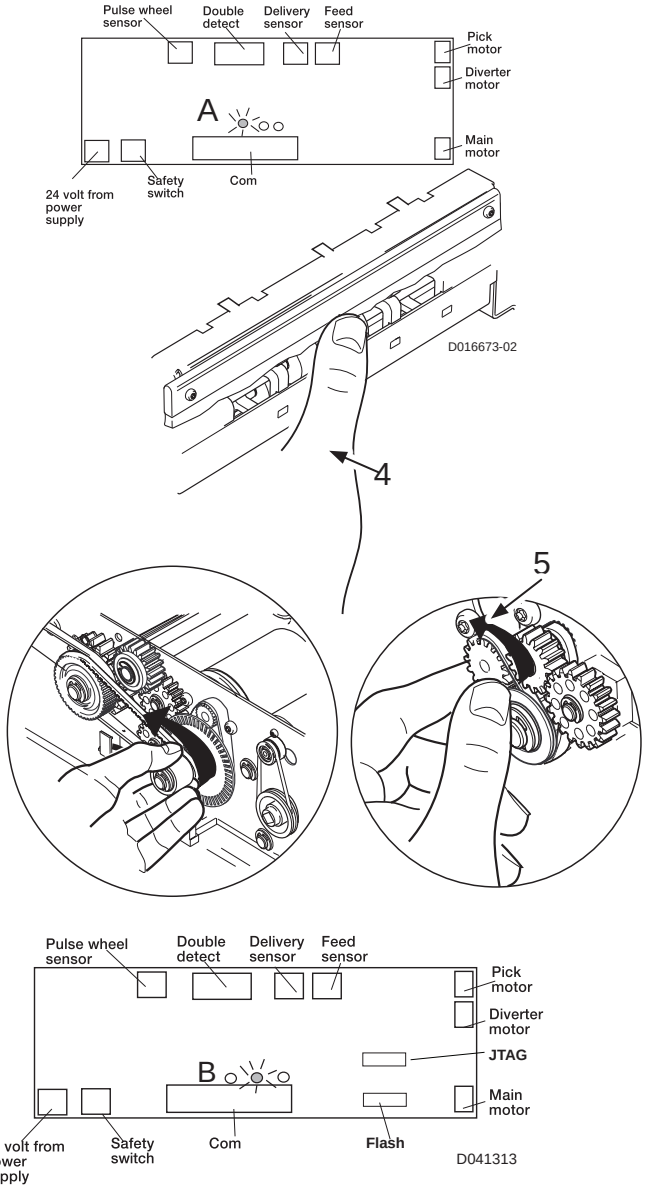
2. **Go to tests and choose Test mode.**

3. **Check that diverter, main motor and pick roller motor are running.**

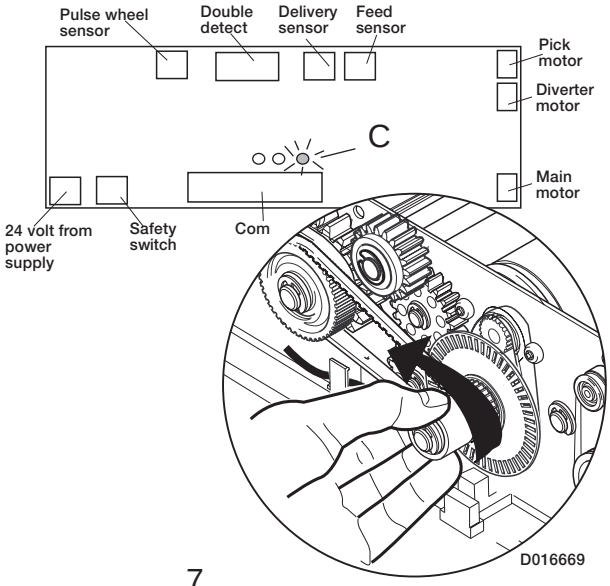


4. **Check the exit sensor, LED A on the Mini-Mech Controller (MMC) lights up when it is covered.**

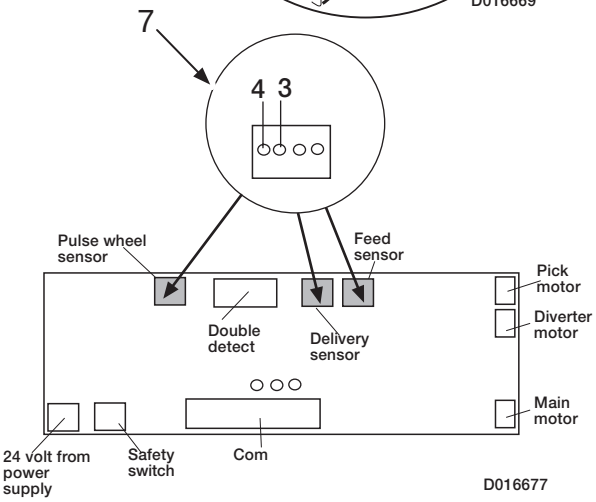
5. **Check the feed sensor, LED B on the MMC lights up when the sensor is covered by a note. Move a note from the cassette by turning the pick roller and the transport roller by hand.**



6. **Check the pulse wheel sensor by moving the wheel, the led C on the MMC should flash.**

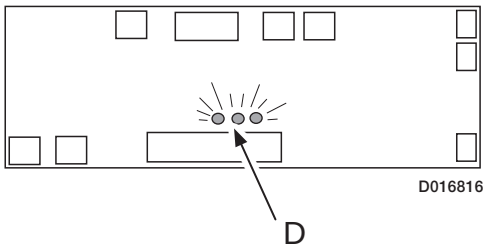


7. **If an led doesn't respond check the voltage by measuring on pin 3 and 4 on the connectors on the MMC. The voltage should be >4V when closed and <1V when open.**



8. **If OK, load the cassette with notes and choose MM test. The test sequence will run automatically according to 8 to 10.**

9. **The machine will perform a learning note procedure. Note that all three LEDs´ (D) will flash before this operation. The width and thickness of the first five notes will be measured. These notes are then sent to the reject pocket in the cassette.**



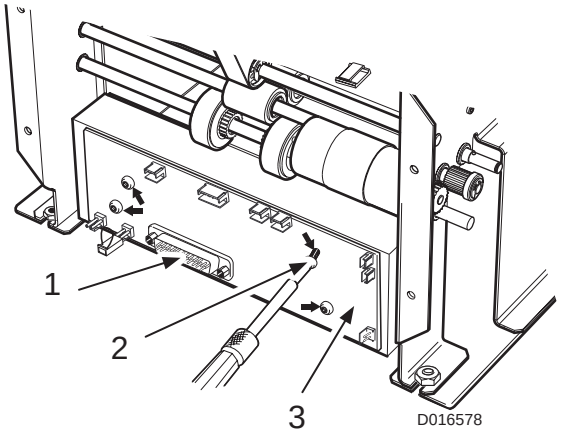
10. **10 feedings of 1 note in each.**

11. **1 test dispense of 1 note to reject area.**

12. **1 feeding of 50 notes.**

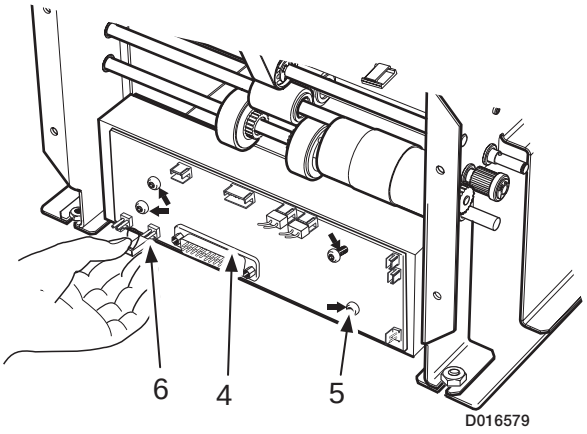
Removal of circuit board

1. **Disconnect the 10 connectors from the circuit board.**
2. **Loosen and remove the 4 screw holding the board to the Feed Sensor Plate.**
3. **Remove the board.**



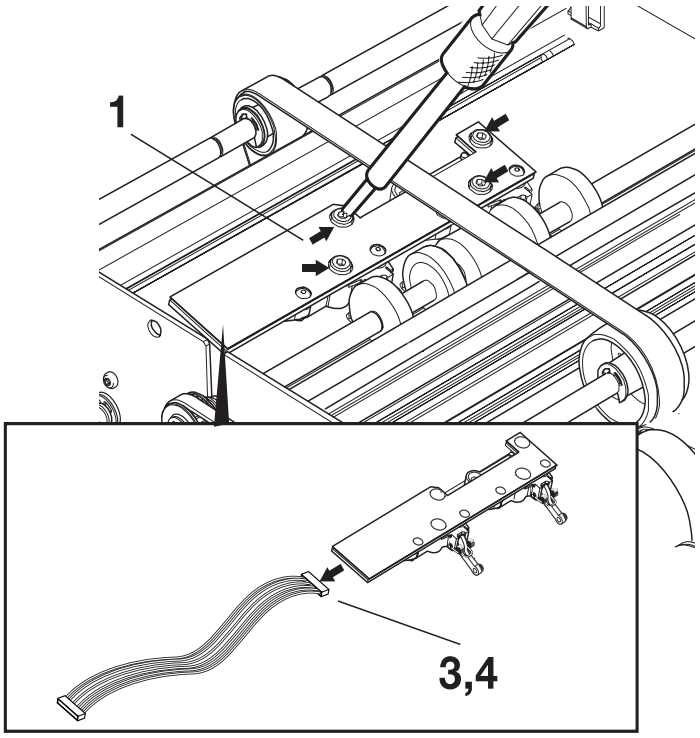
Fitting of circuit board

4. **Carefully fit the board to the feed sensor plate. Note that there must be a rubber spacer on the rear side of the board behind the com connector to prevent contact with the plate.**
5. **Insert and carefully tighten the four screws to fasten the board to exit sensor plate as shown.**
6. **Connect the 10 connectors to the circuit board.**



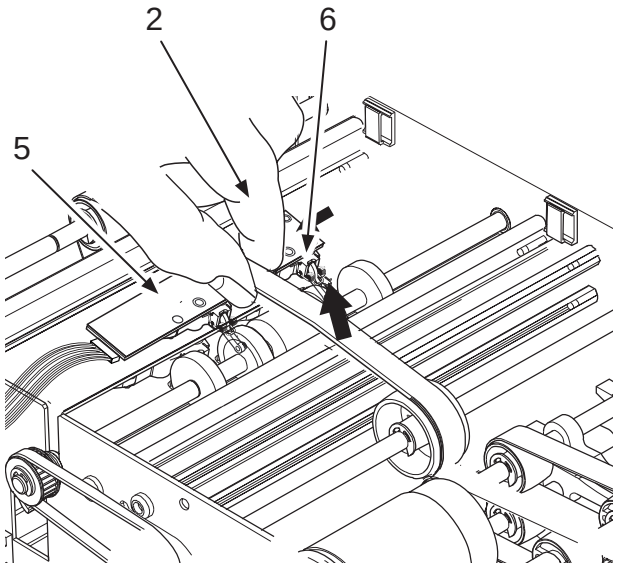
Removal of double detect assy.

1. **Remove the four screws holding the double detect assy. to the outer note guide.**
2. **Lift the belt slightly up and slide out the double detect assy.**
3. **Disconnect the connector from the board.**



Fitting of the double detect assy.

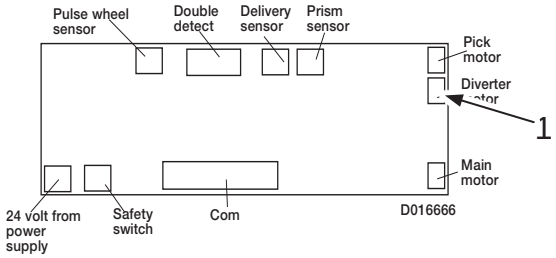
4. **Connect the connector to the circuit board.**
5. **Carefully fit the double detect assy. to the outer note guide.**
6. **Insert and carefully tighten the four screws holding the double detect assy. to the outer note guide.**



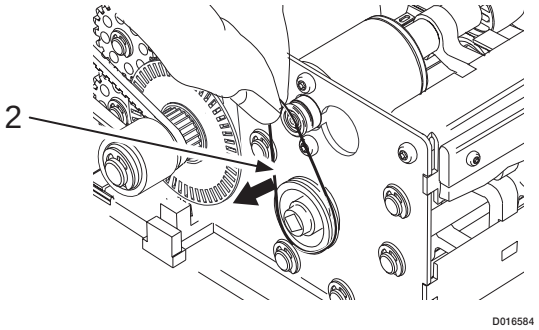
D016583

Removal of diverter motor

1. **Remove the connector from the MMC board and release the cable.**

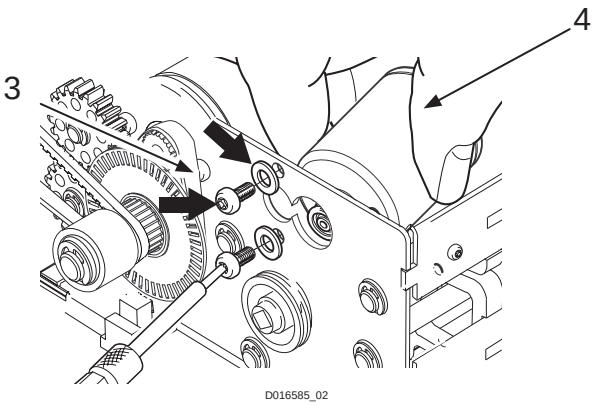


2. **Remove the O-ring.**



3. **Loosen and remove the two screws and washers.**

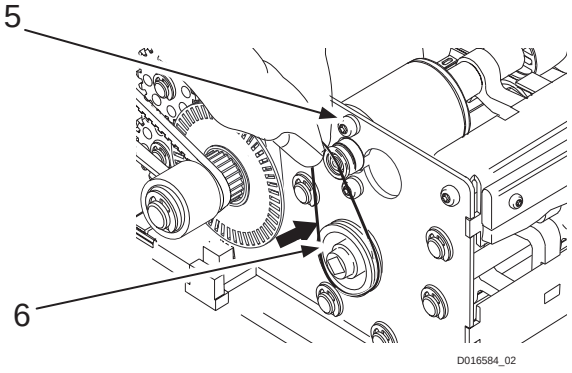
4. **Slide the motor towards the note outlet and remove it.**



Fitting of diverter motor

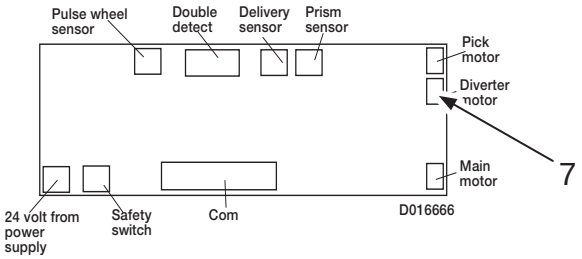
5. **Carefully fit the diverter motor to the sideplate. Insert and carefully tighten the two screws with the washers to fasten the motor to the sideplate.**

	NOTE:
	The motor will be damaged if the washers are missing



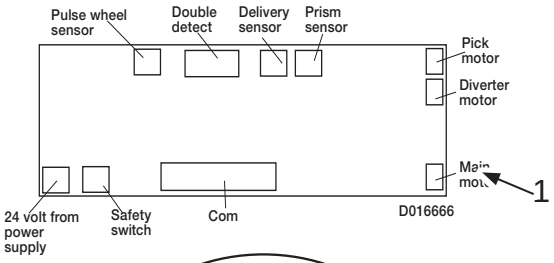
6. **Fit the O-ring between the diverter motor and the diverter.**

7. **Connect the cable to the MMCboard and strap the cable.**



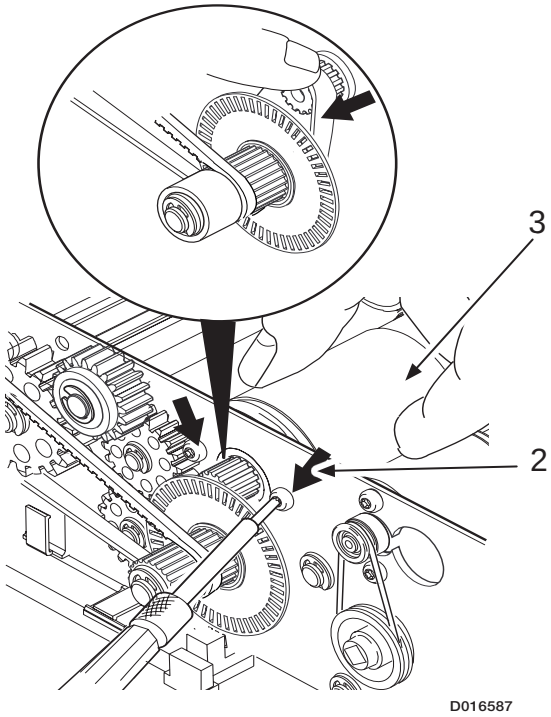
Removal of the main motor

1. **Remove the connector from the MMC board and loosen the cable.**



2. **Remove the two screws.**

3. **Remove the main motor and the distance washer.**

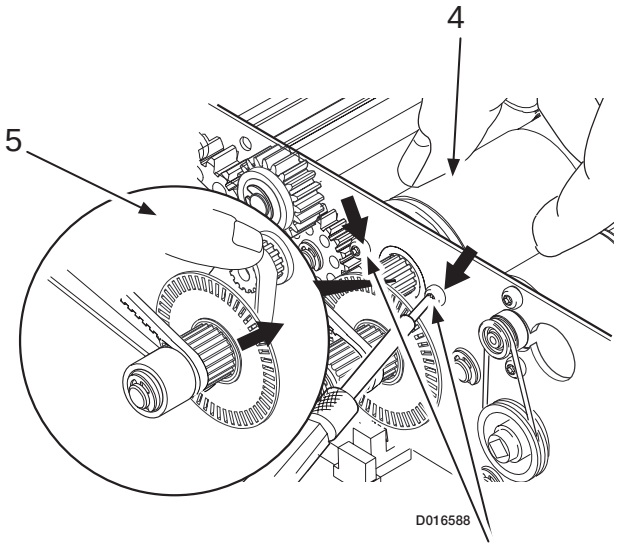


Fitting of the main motor

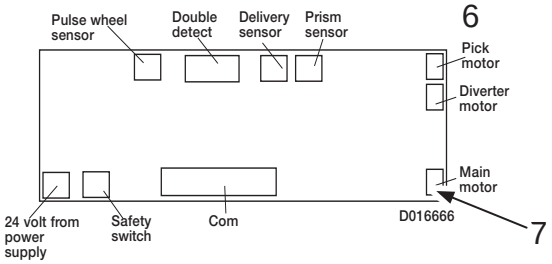
4. **Carefully fit the main motor and the distance washer.**

5. **Fit the belt to the cogwheel.**

6. **Insert and carefully tighten the two screws.**

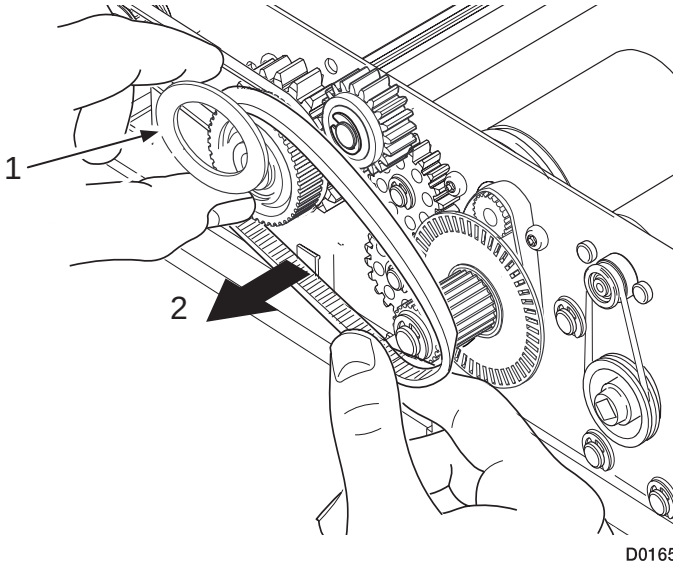


7. **Connect the cable to the MMC board and secure it.**



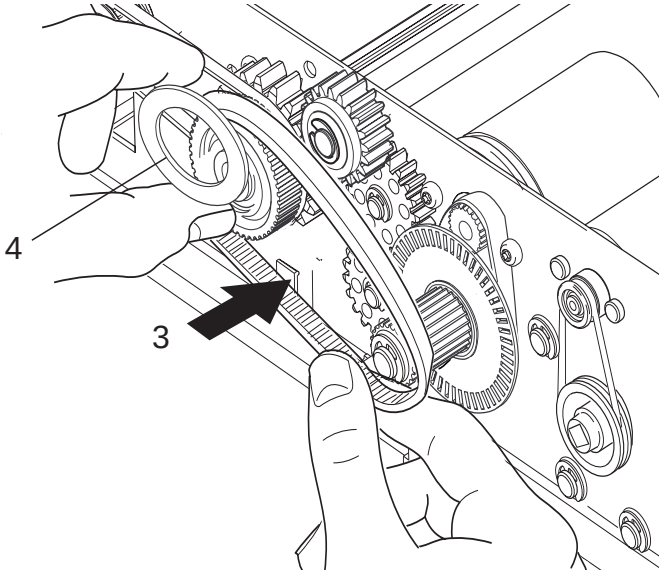
Removal of belt to pulse wheel

1. **Remove the snap on washer.**
2. **Remove the belt.**



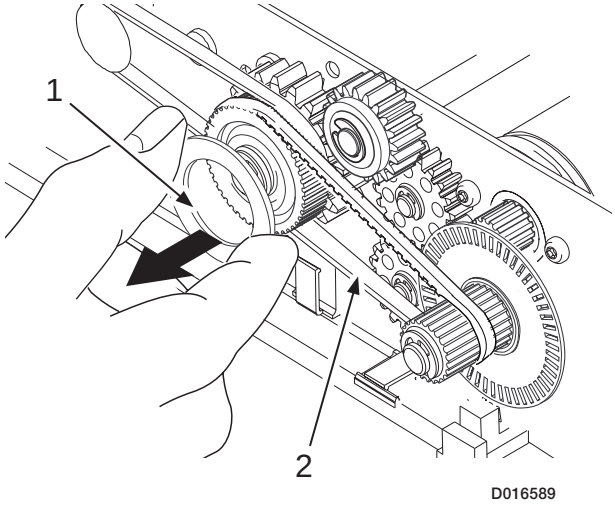
Fit the belt to the pulse wheel

3. **Fit the belt to the pulse wheel.**
4. **Mount the snap on washer.**

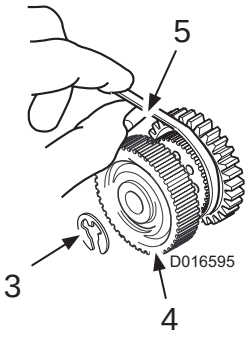


Removal of belt to double detect shaft

1. **Remove the snap on washer.**
2. **Remove the belt.**

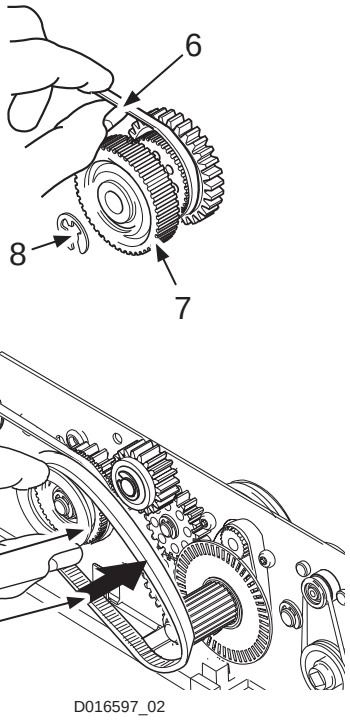


3. **Remove the C-clip.**
4. **Remove the cogwheel.**
5. **Remove the belt.**



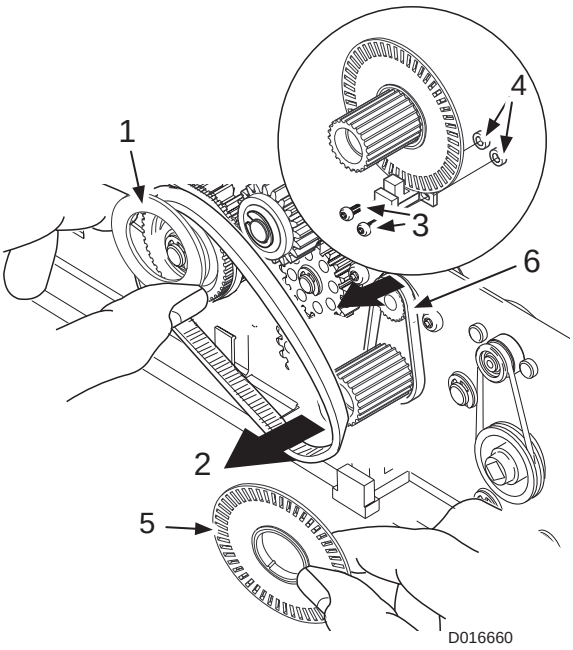
Fitting of new belts

6. **Mount the new belt.**
7. **Mount the cogwheel.**
8. **Mount the C-clip.**
9. **Mount the new belt.**
10. **Snap on the washer.**



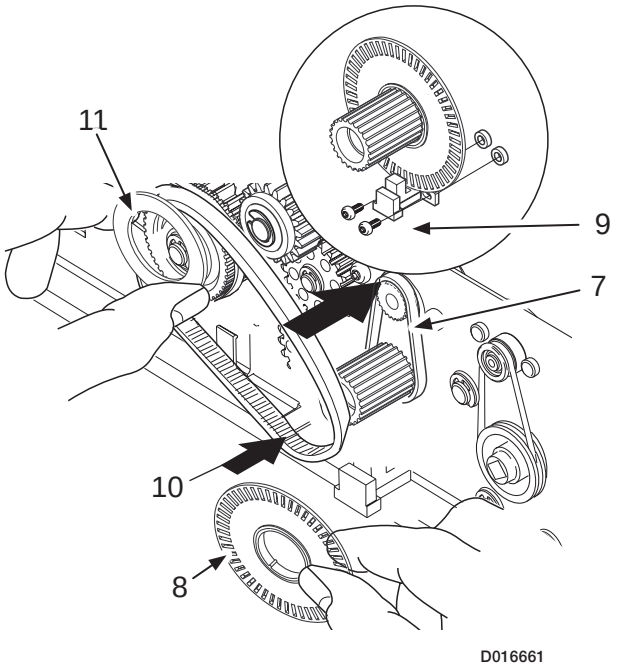
Removal of belt from main motor to pulse wheel

1. **Remove the snap on washer.**
2. **Remove the belt.**
3. **Remove the sensor board by loosening and removing the two screws.**
4. **Note the two spacers behind the board.**
5. **Snap off the pulse disc from the wheel.**
6. **Remove the belt.**



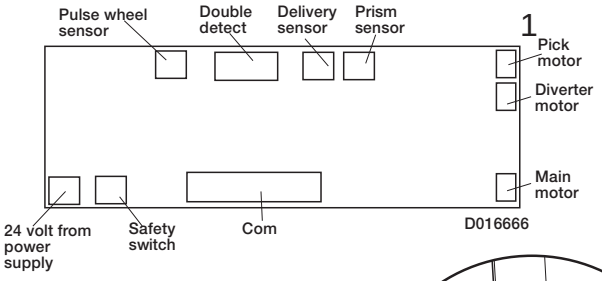
Fitting of new belt

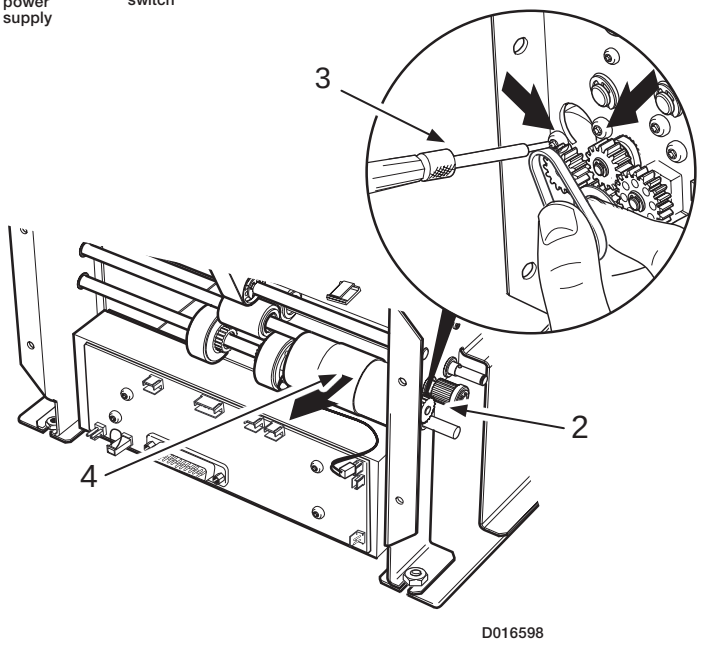
7. **Fit the belt to the cogwheels.**
8. **Snap on the pulse disc to the wheel.**
9. **Mount the sensor board and the two distance washers with the two screws and tighten carefully.**
10. **Fit the belt.**
11. **Snap on the washer.**



Removal of pick motor

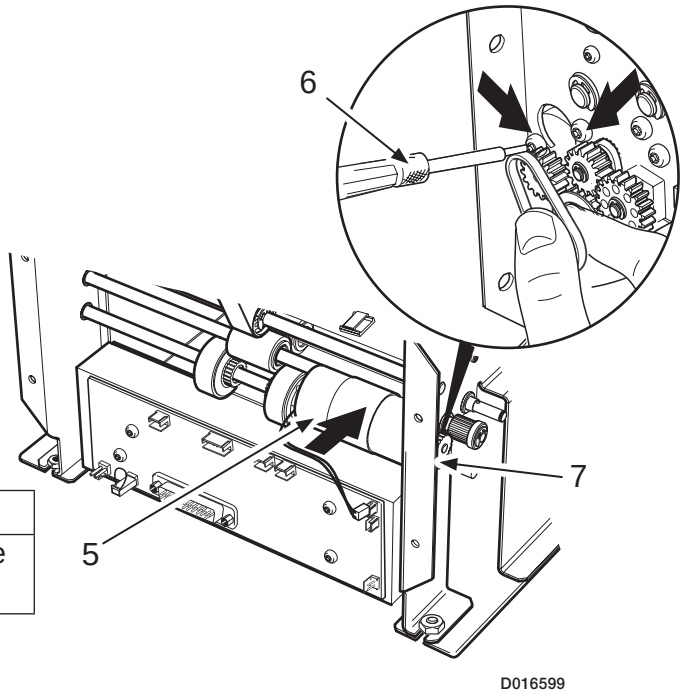
1. **Disconnect the connector from the MMC board.**
2. **Remove the belt from the pick motor.**
3. **Loosen and remove the two screws.**
4. **Carefully slide out the motor.**



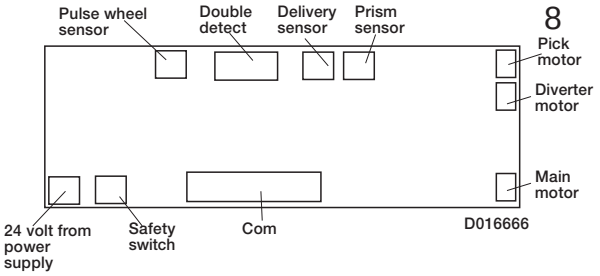


Fitting of pick motor

5. **Carefully fit the pick motor to the side-plate.**
6. **Carefully tighten the two screws.**
7. **Fit the belt to the motor.**
8. **Connect the connector to the MC board.**

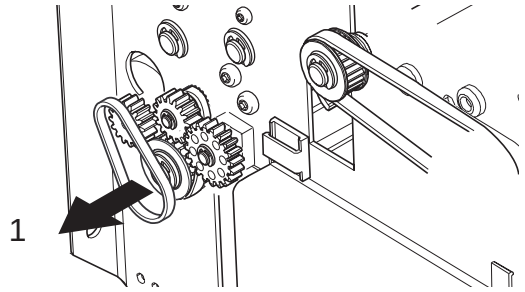


	NOTE:
	Make sure that the cable connection are on the lower part of the motor.

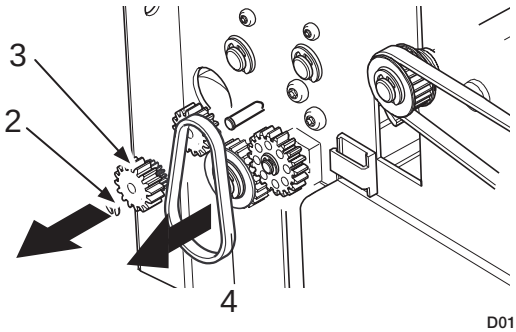


Removal of belt from pick roller shaft to support roller shaft

1. **Remove the belt from the pick motor.**



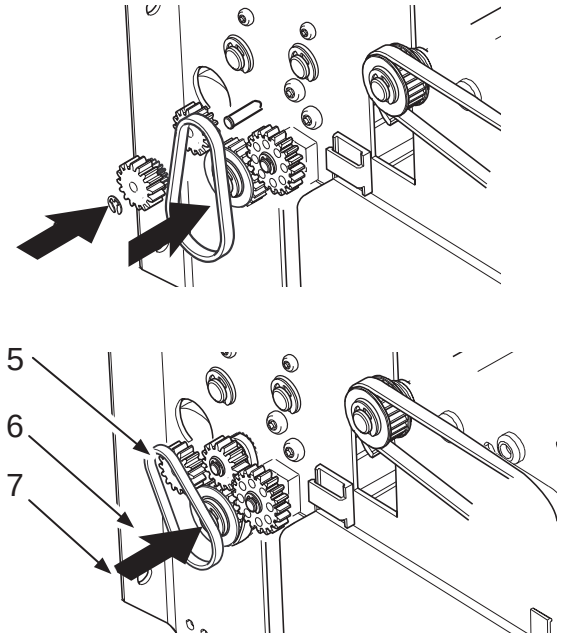
2. **Remove the C-clip from the support roller shaft.**
3. **Remove the cogwheel by turning it clockwise to make it easier to remove.**
4. **Remove the belt.**



D016606

Fitting of belt from pick roller shaft to support roller shaft

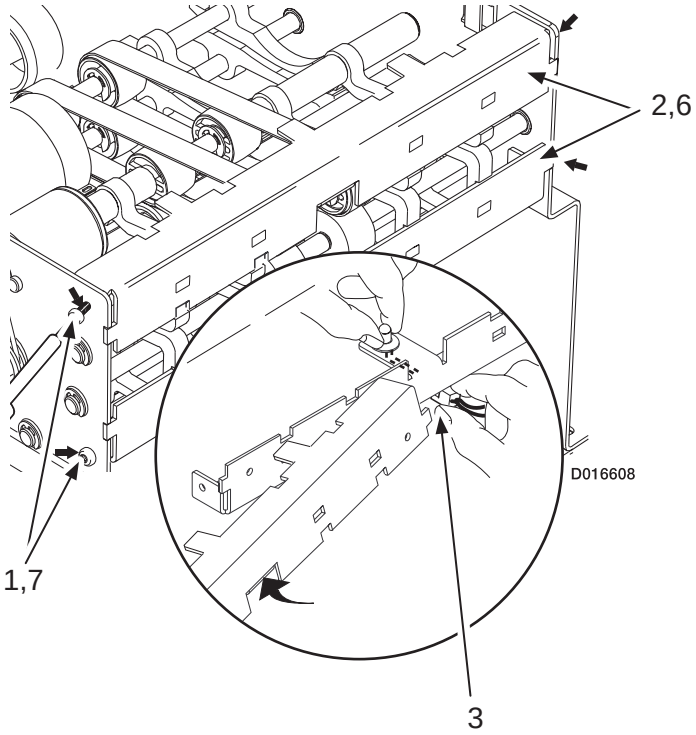
5. **Mount the new belt.**
6. **Fit the cogwheel.**
7. **Mount the C-clip.**
8. **Mount the belt on the pick motor.**



D016607

Removal of exit sensor

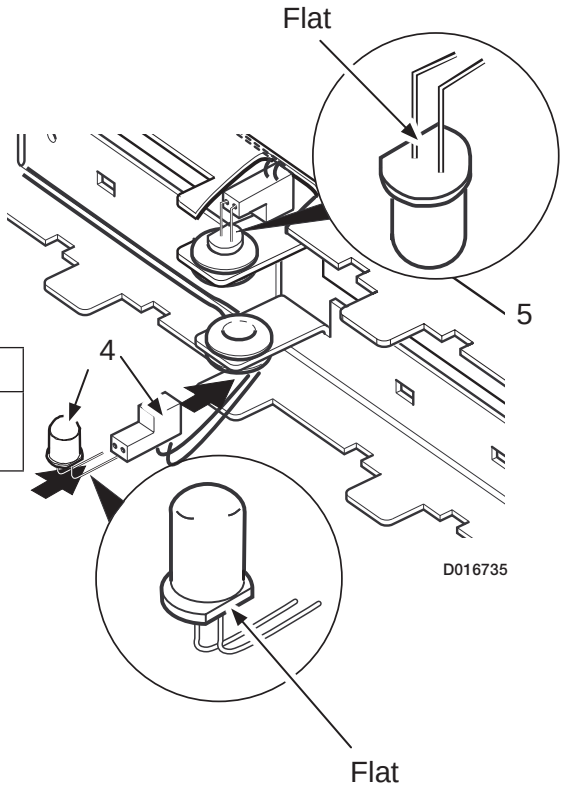
1. **Loosen and remove the four screws.**
2. **Carefully remove the brackets from the side plates and disconnect the connector.**
3. **Push out the transistor or diode.**



Fitting of the delivery sensor

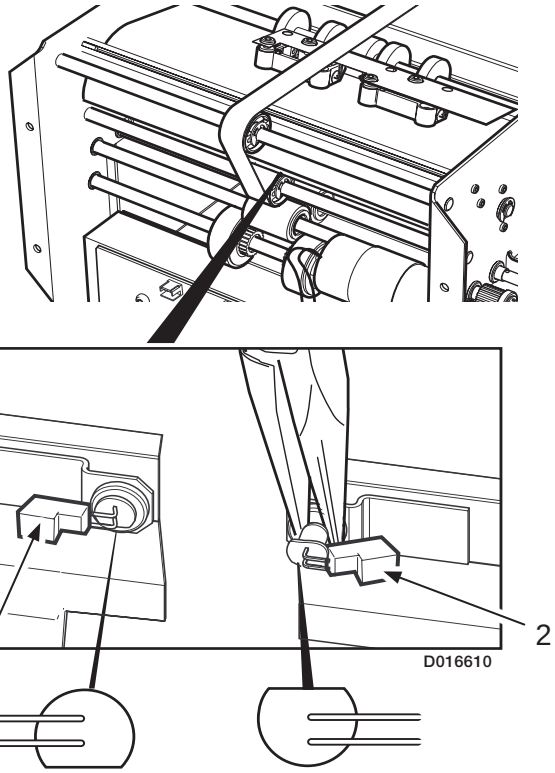
4. **Fit the transistor or diode.**
5. **Connect the connector.**
6. **Fit the brackets to the side plates.**
7. **Tighten the four screws.**

	NOTE:
	The drawing is viewed from the motor side of the machine.



Removal of feed sensor

1. **Carefully remove the transistor or diod using a pair of flat pliers.**
2. **Disconnect the connector.**



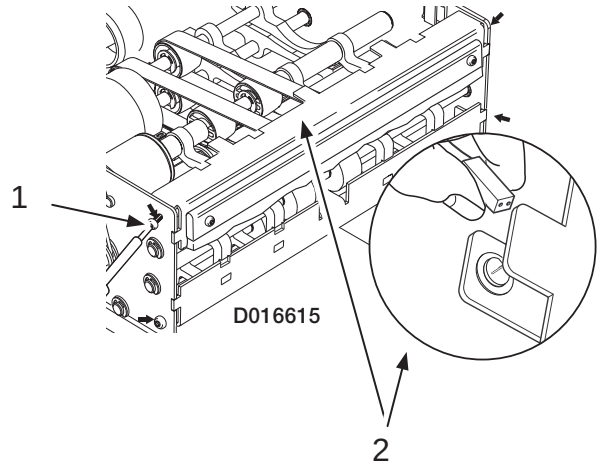
Fitting of feed sensor

3. **Carefully fit the transistor or diode using a pair of flat pliers.**
4. **Connect the connector.**

Removal of belts upper transport

1. **Loosen and remove the two screws holding the sensor bracket.**

2. **Carefully remove the bracket and disconnect the connector.**

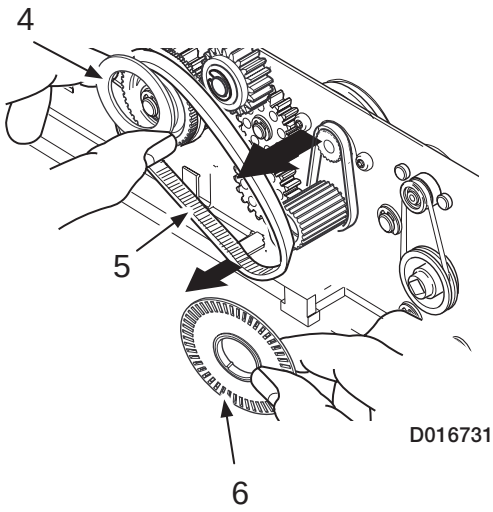


3. **Move the two belts one by one to the right hand sideplate passing them over the note guides.**

4. **Remove the snap on washer.**

5. **Remove the belt from the pulse disc wheel.**

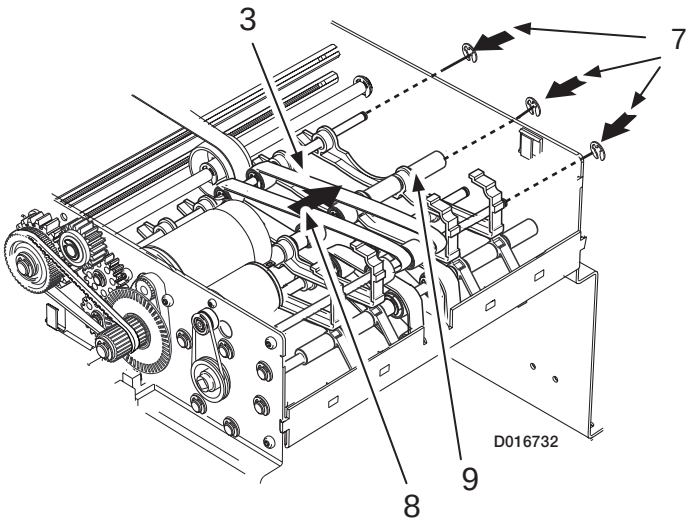
6. **Snap off the pulse disc carefully.**



7. **Remove the c-clips on the three shafts on the right side.**

8. **Remove the c-clip from the roller on the shaft with the black spacers.**

9. **Move the three shafts carefully to the left so the belts can be removed.**



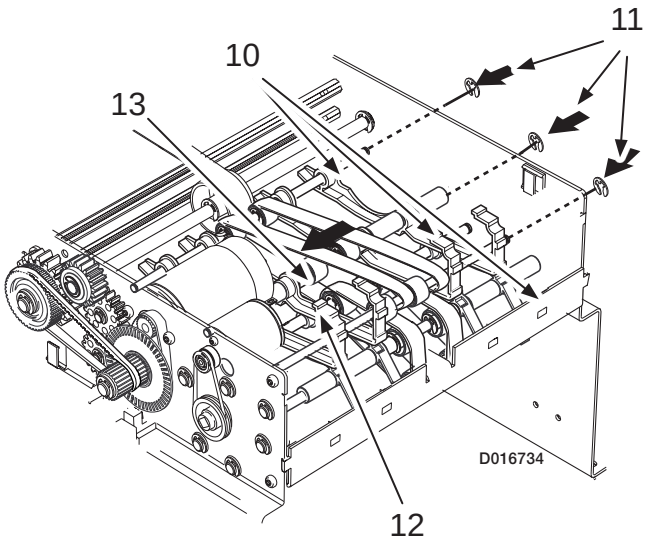
Fitting of belts upper transport

10. **Put in the new belts and fit the shafts into the bearings.**

11. **Fit the c-clips on the shafts.**

12. **Fit the c-clip to fasten the roller on the shaft with the black spacers.**

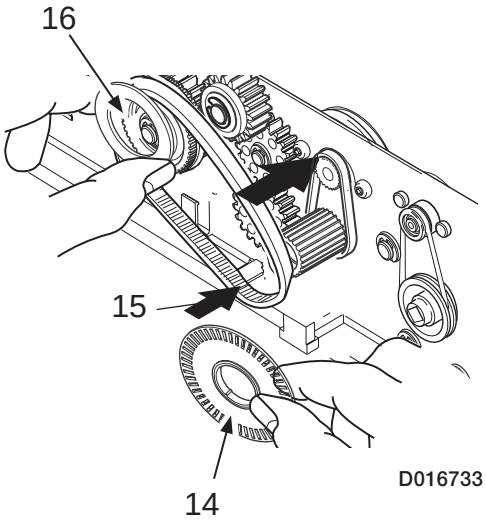
13. **Move the belts one by one to the transport rollers.**



14. **Snap on the pulse disc.**

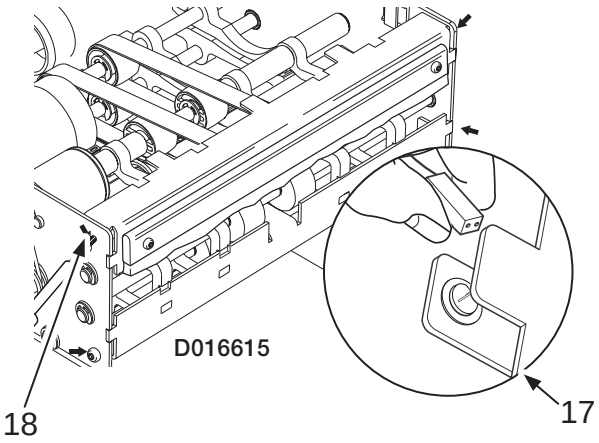
15. **Mount the belt.**

16. **Snap on the washer.**

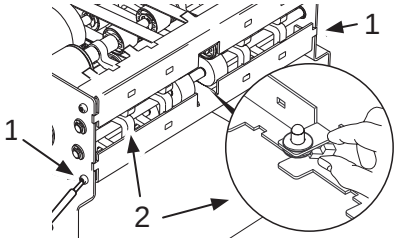


17. **Connect the connector (see page 22) and fit the sensor bracket to the side plates. Ensure the guides are located in the brackets correctly.**

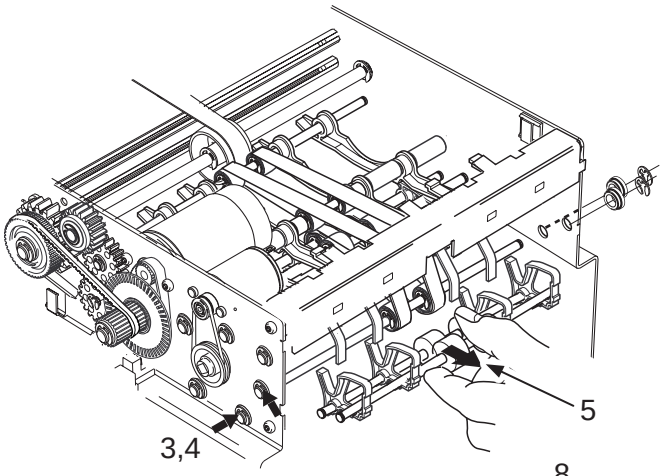
18. **Tighten carefully the two screws.**



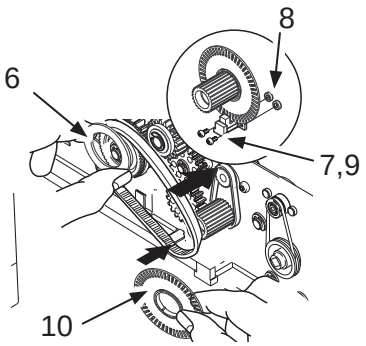
Removal of belts in lower transport



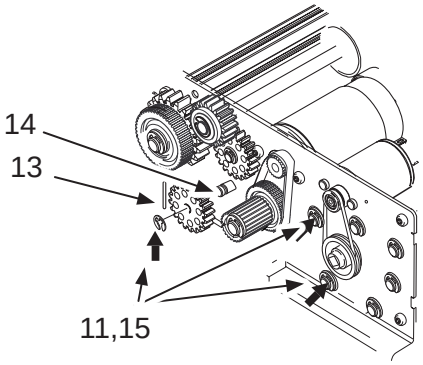
1. **Loosen and remove the two screws holding the sensor bracket.**
2. **Carefully remove the bracket and disconnect the connector.**



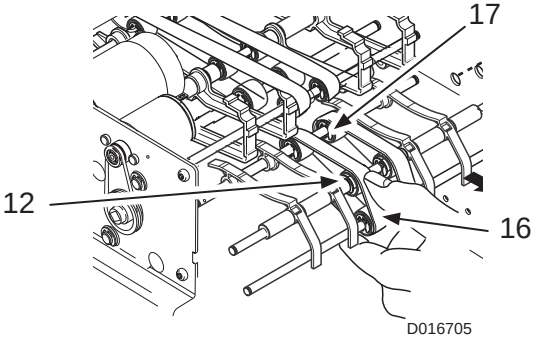
3. **Remove the c-clips on the two shafts. (2 each side).**
4. **Remove the four bearings.**
5. **Remove the two shafts including the plastic guides.**



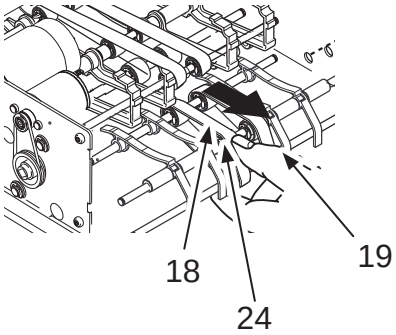
6. **Snap off the washer and remove the belt.**
7. **Loosen and remove the two screws holding the sensor board.**
8. **Note the two spacers behind the board.**
9. **Remove the board.**
10. **Snap off the pulse disc.**



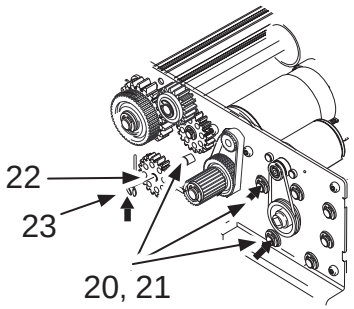
11. **Remove the c-clips and bearings from the three shafts shown (Both sides).**
12. **Remove the c-clip holding the roller on the shaft with the black spacers.**
13. **Remove the cogwheel and cylindric pin.**
14. **Remove the c-clip on the shaft.**
15. **Remove the bearings.**
16. **Take carefully out the lower transport.**
17. **Remove the two belts.**



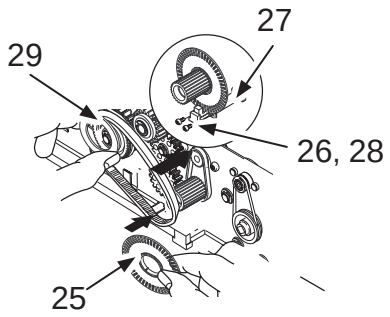
Removal of belts in the lower trans



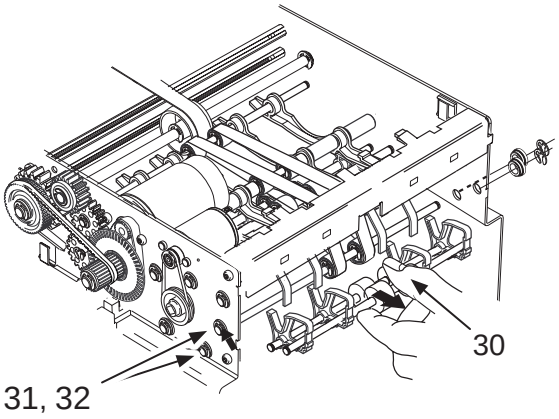
18. **Fit the two belts.**
19. **Fit the lower transport into the sideplates.**



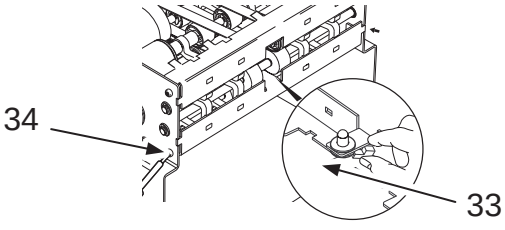
20. **Mount the bearings.**
21. **Mount the c-clips on the shafts.**
22. **Mount the cylindric pin and the cogwheel.**
23. **Mount the c-clip on the shaft.**
24. **Mount the c-clip holding the roller on the shaft with the black spacers.**



25. **Snap on the pulse disc.**
26. **Mount the sensor board.**
27. **Note the two spacers behind the board.**
28. **Tighten carefully the two screws holding the board.**
29. **Mount the belt and snap on the washer.**



30. **Fit the two shafts including guides.**
31. **Mount the bearings.**
32. **Mount the c-clips.**



33. **Connect the connector (see page 22) and carefully fit the bracket to the side plates and guides. Ensure the guides are located in the brackets correctly.**
34. **Tighten the two screws.**

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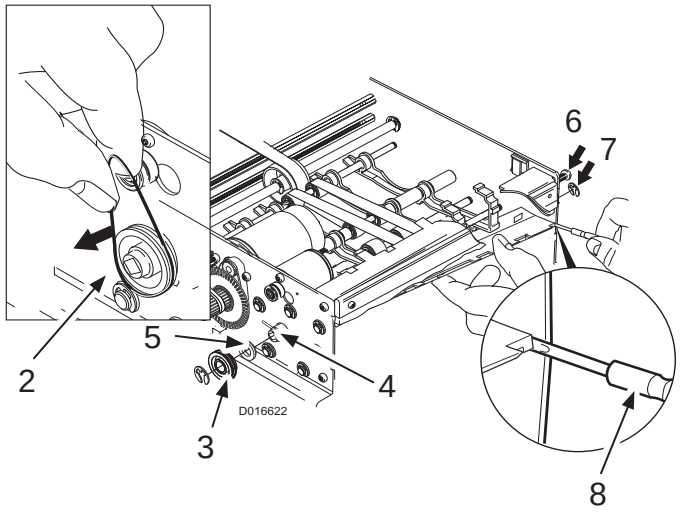
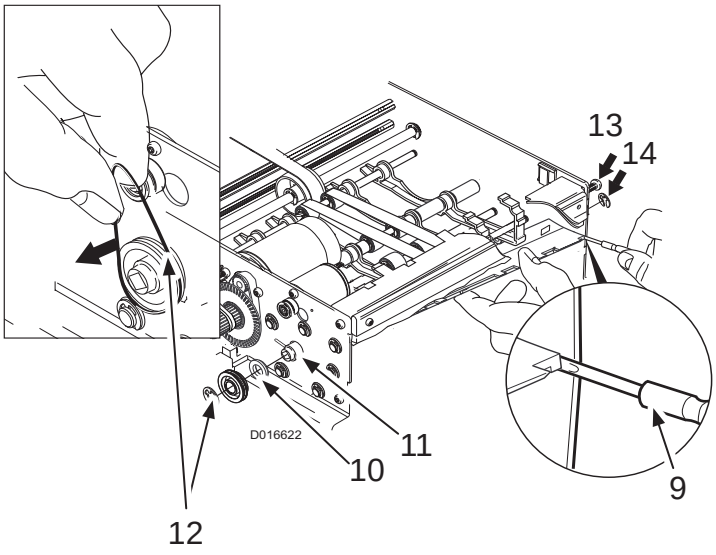
Removal of diverter



1. **Carry out paragraphs 1 - 16 on page 26. (Removal of belts in lower transport).**
2. **Remove the O-ring.**
3. **Remove the C-clip and the wheel.**
4. **Remove the cylindric pin.**
5. **Remove the bearing.**
6. **Loosen the screws to the upper bracket.**
7. **Remove the C-clips from the three shafts in the upper transport. (See page 24).**
8. **Use a screw driver to carefully push out the sideplate so the diverter can be removed.**

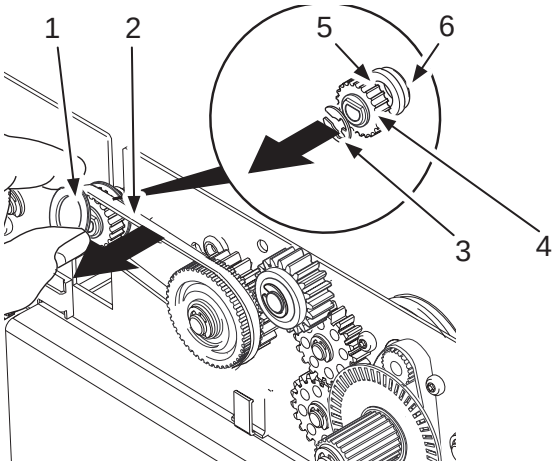
Fitting the diverter



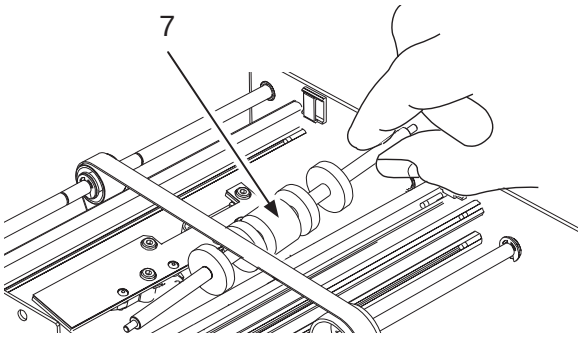
9. **Fit the diverter into the holes by using a screw driver to carefully push out the gables.**
10. **Mount the bearing.**
11. **Mount the cylindric pin and the wheel.**
12. **Mount the c-clip and the O-ring.**
13. **Tighten the screws.**
14. **Fit the c-clips.**
15. **See page 26 how to fit the lower transport.**

Removing the upper guide

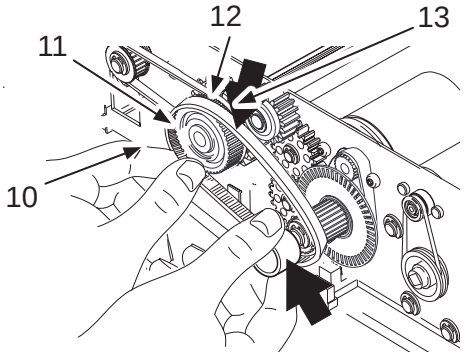
Removing the double detect transport shaft



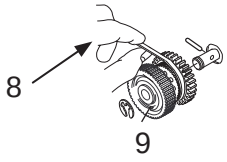
1. **Snap off the washer.**
2. **Remove the belt.**
3. **Remove the c-clip.**
4. **Remove the wheel.**
5. **Remove the two c-clips. (1 each side).**
6. **Remove the bearings.**
7. **Lift up the belt and remove the shaft.**

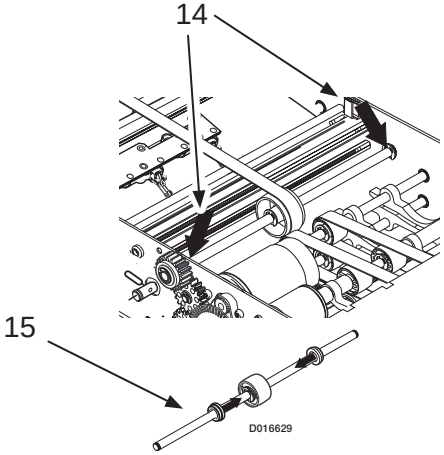


Removing of driving shaft



8. **Snap off the washer.**
9. **Remove the belt.**
10. **Remove the c-clip.**
11. **Remove the two wheels and the belt.**
12. **Remove the pin.**
13. **Remove the two clips from the inside of the bearings. (1 each side).**
14. **Move the bearings toward the center.**
15. **Remove the shaft.**





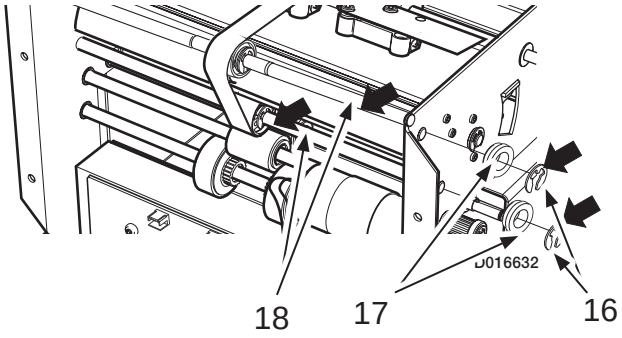
Removing of upper guide

Removing of transport rollers

16. **Remove the clips from the two shafts on the right and left side.**

17. **Remove the bronze bearings.**

18. **Remove the two shafts.**

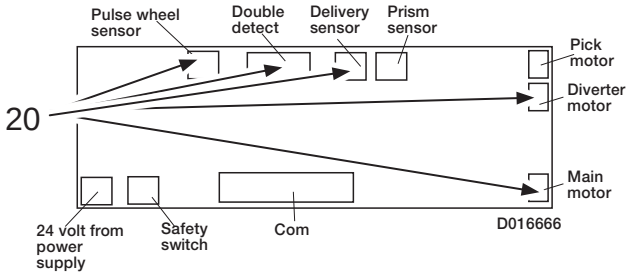


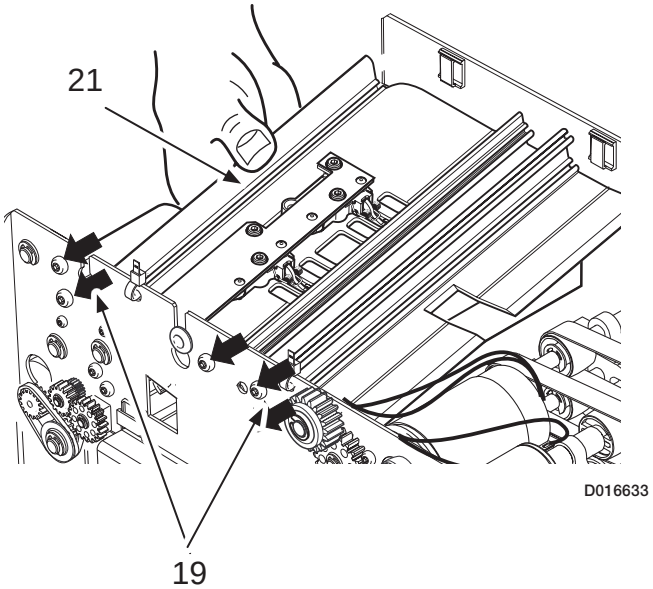
Removing the upper guide plate

19. **Loosen and remove the 10 screws. (5 each side).**

20. **Remove the self adhesive clips and grommet, disconnect the cables to the diverter motor, main motor, double detect, delivery sensors and the pulse wheel sensor from the MMC board.**

21. **Carefully lift up the guide.**





Removing the picker roller

22. **Remove the c-clip.**

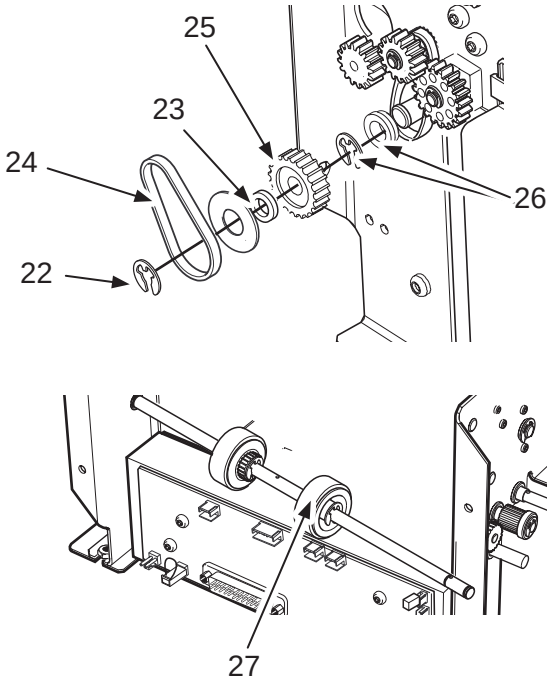
23. **Remove the plastic distance and the aluminium washer.**

24. **Remove the belt.**

25. **Dismount the wheel and the pin.**

26. **Dismount c-clips and bearings.**

27. **Remove the pick roller.**

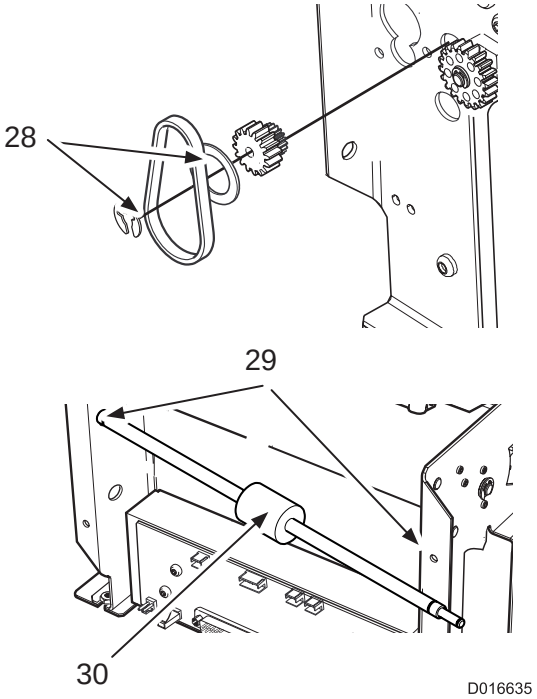


Removing the support roller

28. **Remove the c-clip, the belt and the wheel from the shaft.**

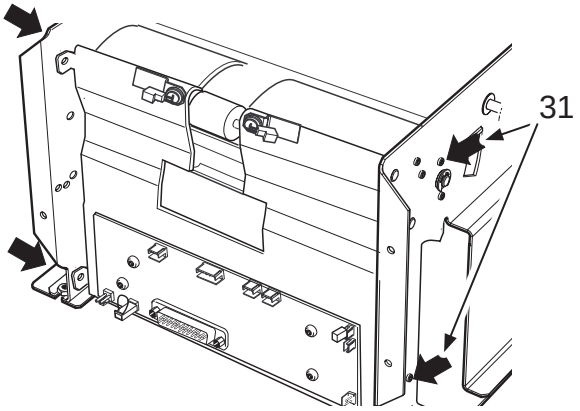
29. **Remove the C-clips (both sides) at the plastic bearings and move the bearings inwards toward the roller roller.**

30. **Remove the support roller.**



Removing the counter rotating roller

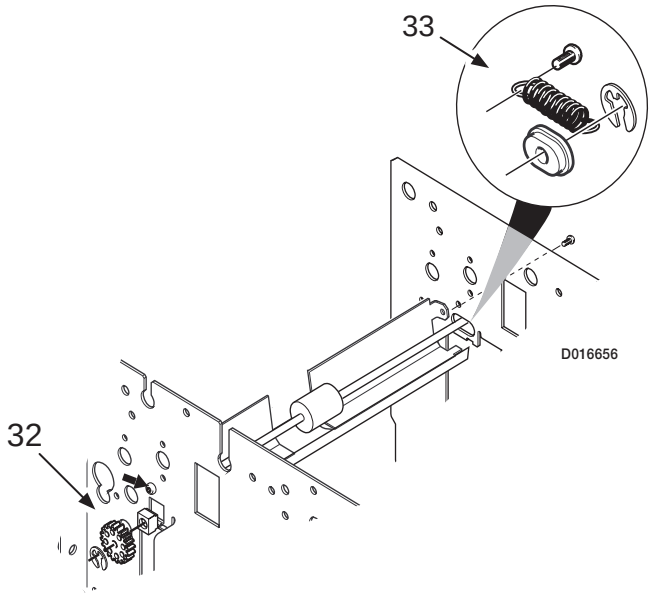
31. **Loosen and remove the four screws holding the sensor plate and remove the plate upwards.**



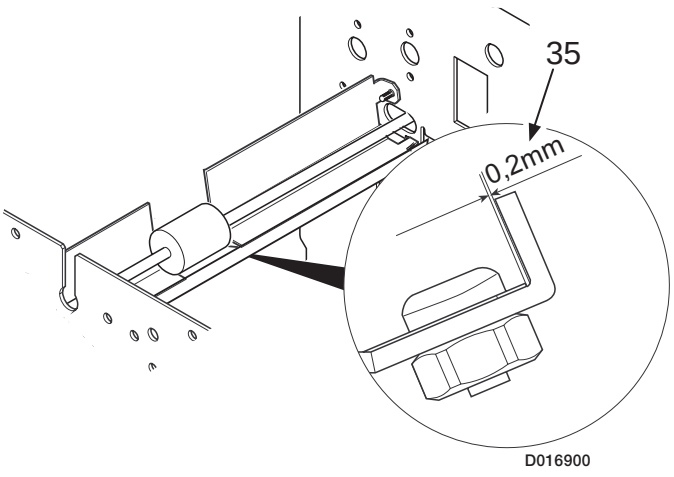
32. **Remove the c-clips, cogwheel, washers and bronze bearing from the shaft.**

33. **Note the orientation of the clutched cogwheel.**

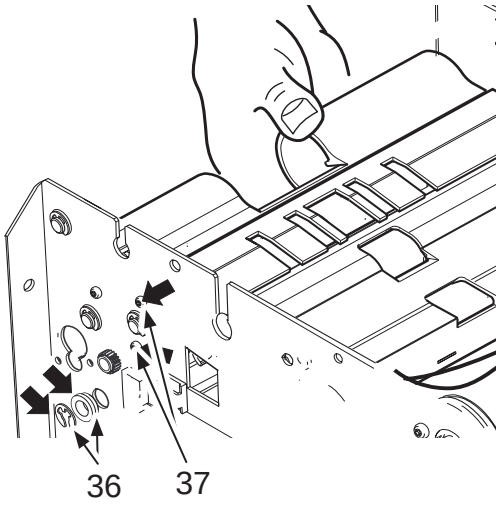
34. **Remove the bronze bearing and spring.**



35. **When assembling the cover to the CCR guide check that there is a space of 0,2mm between the edge of the cover and the edge of the CCR guide.**

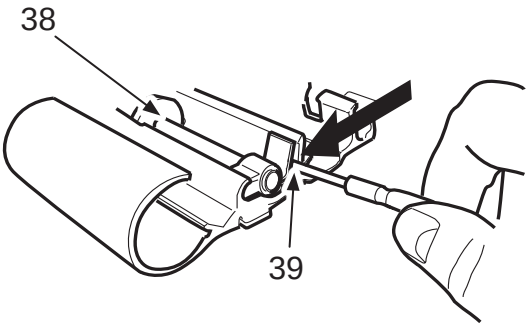


Remove the lower guide



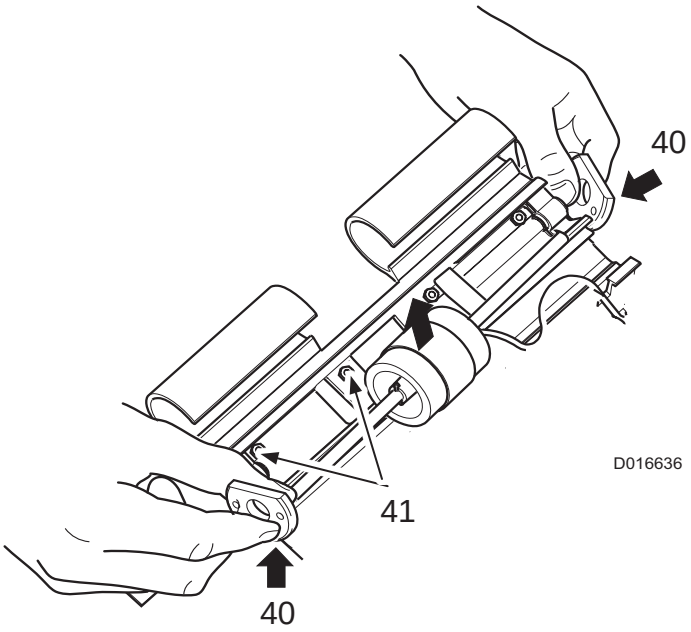
36. **Loosen and remove c-clips and bearings.**

37. **Loosen and remove four screws.**



38. **Bend carefully out the side plate and remove the lower guide.**

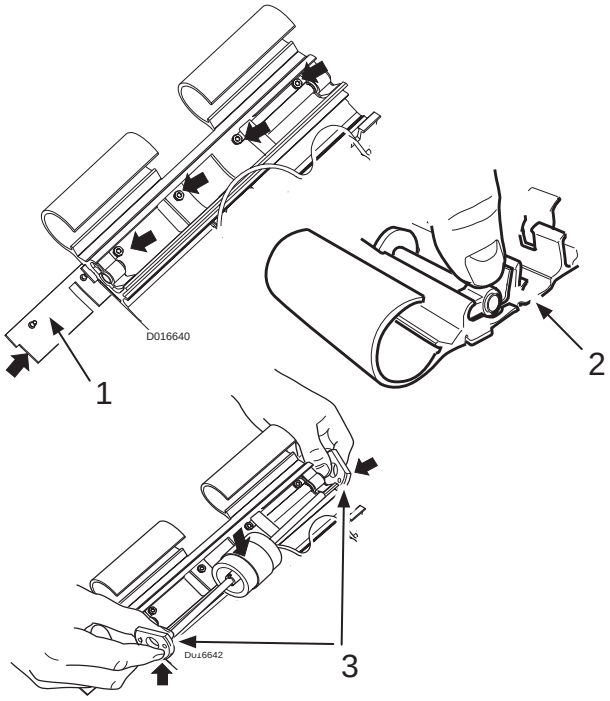
39. **Remove the two plastic washers and lift out the prism shaft.**



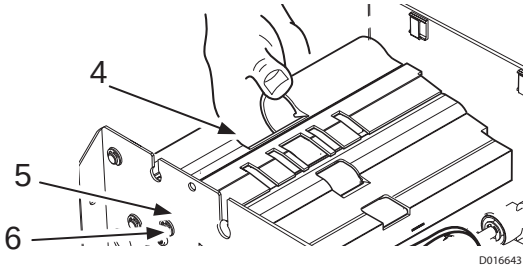
40. **Release rollers and shafts by gently levering the holders out from the lower guide.**

41. **Remove the reference guide by removing the four nuts.**

Assembling/replacing parts lower guide

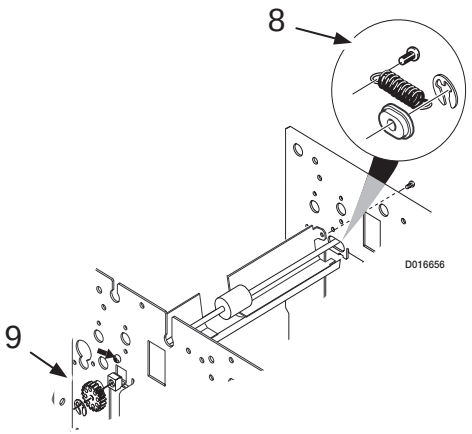


1. **Fit the reference guide to the lower guide and fasten it with the four nuts.**
2. **Fit holders and rollers into the lower guide and fasten it by gently push at each holder.**
3. **Fit the prism shaft with the two plastic washers.**

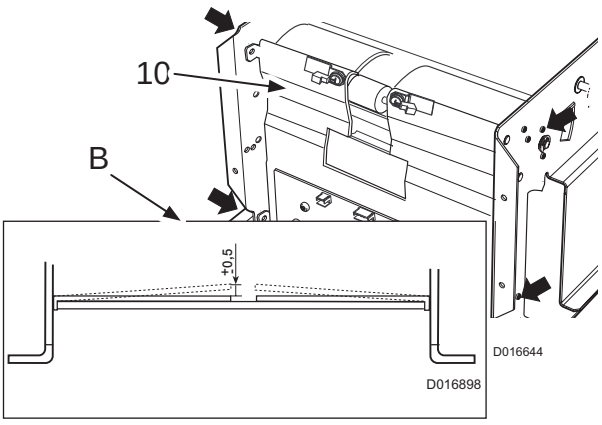


4. **Carefully lever out the side plate and fit the lower guide.**
5. **Fasten the two plastic washers with the four screws.**
6. **Fit the plastic bearings and the c-clips.**

Assembling/replacing counter rotating roller



7. **Fit the bronze bearing and spring.**
8. **Fit the bronze bearing and cogwheel on the shaft and lock it with the c-clips.**



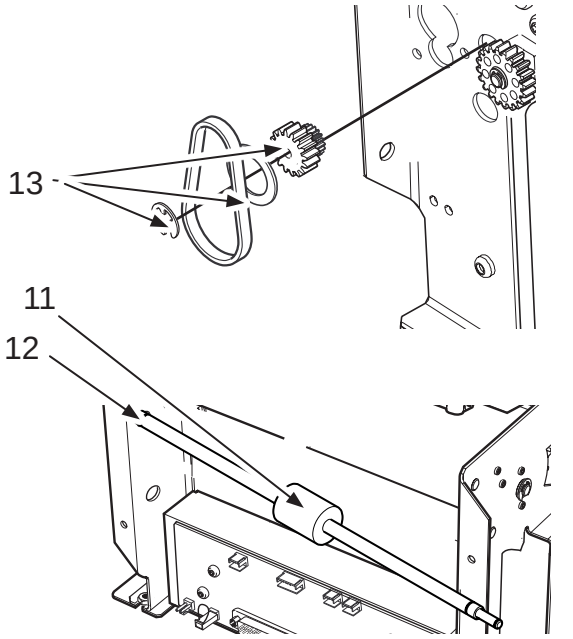
9. **Fit the sensor plate and tighten the four screws.**
10. **Check that the deviation is less than ±0.5 (B).**

Assembling/replacing support roller

11. **Fit the support roller.**

12. **Fit the bronze bearings and the c-clips to the shaft.**

13. **Fit the wheel, belt and c-clip to the shaft.**



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Assembling/replacing the pick roller

14. **Fit the pick roller.**

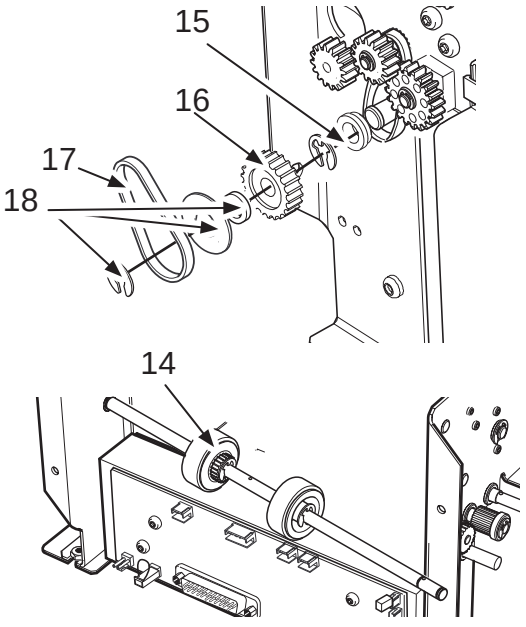
15. **Fit the bronze bearings and c-clips.**

16. **Mount the pin and wheel.**

17. **Put on the belt.**

18. **Fit the aluminium washer and the distance and fit the c-clip.**

19. **Fit the pick motor, see page 19.**



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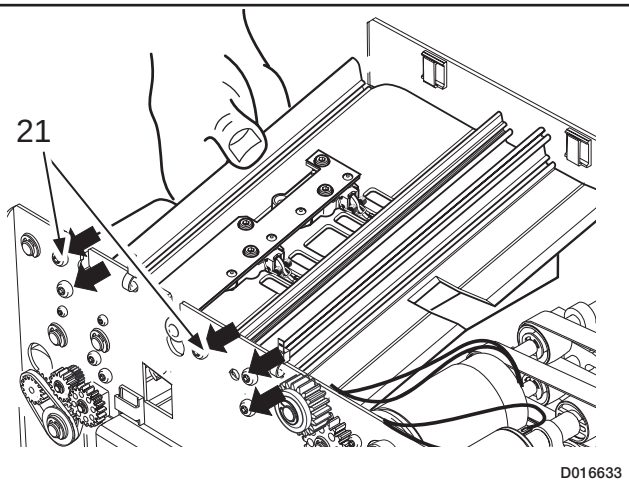
Fitting the aluminium guide plate

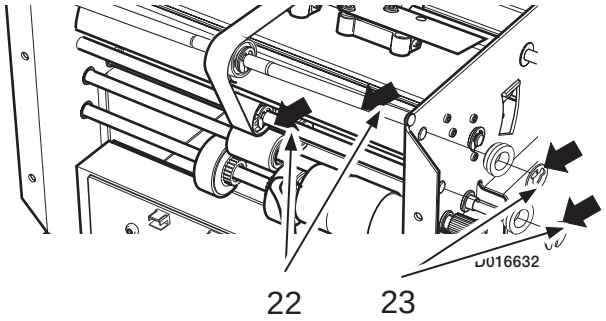
20. **Fit the upper guide plate (change the belt if necessary) and tighten the ten screws.**



Fitting the transport rollers

21. **Fit the two shafts.**

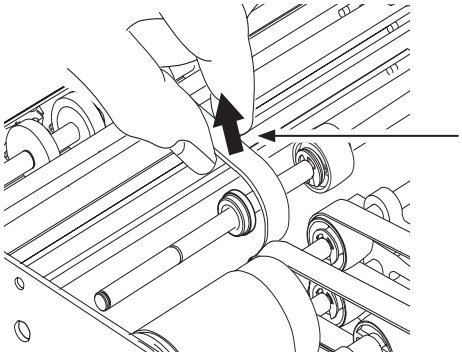
22. **Fit the bronze bearings and the c-clips.**

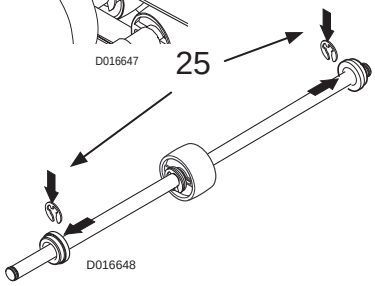


Fitting the drive shaft

23. **Lift up the belt and fit the shaft.**

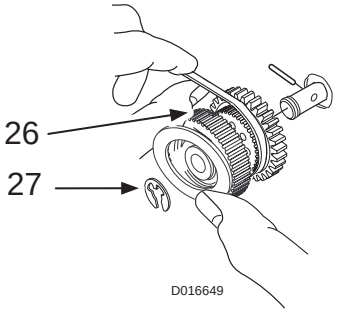
24. **Fit the bronze bearings and the two c-clips.**





25. **Fit the pin, the two wheels and the belt.**

26. **Fit the c-clip and the snap on washer.**



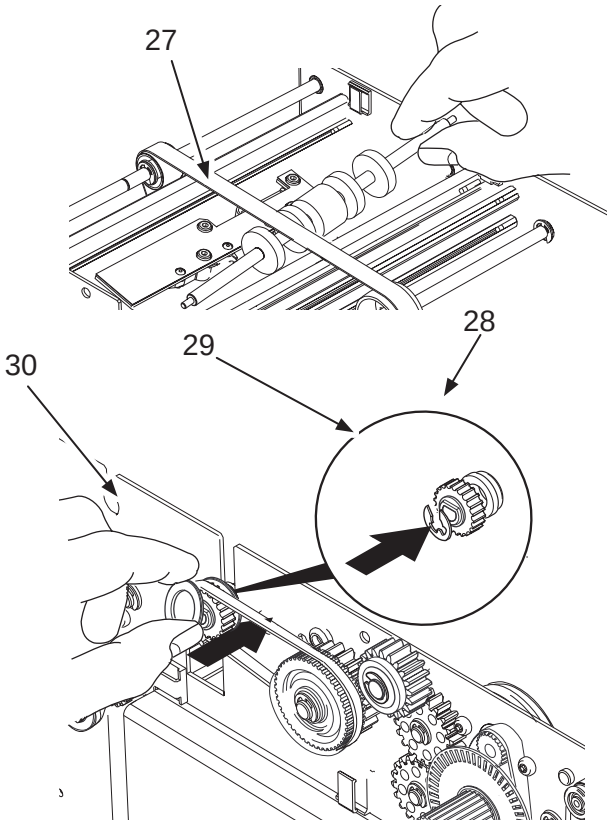
Fitting the double detect transport roller

27. Lift up the belt and fit the shaft.

28. Fit the bronze bearings and the c-clips.

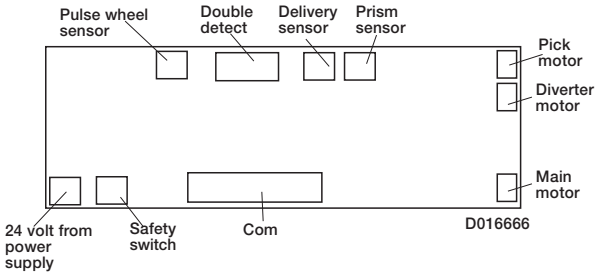
29. Fit the wheel and the c-clip.

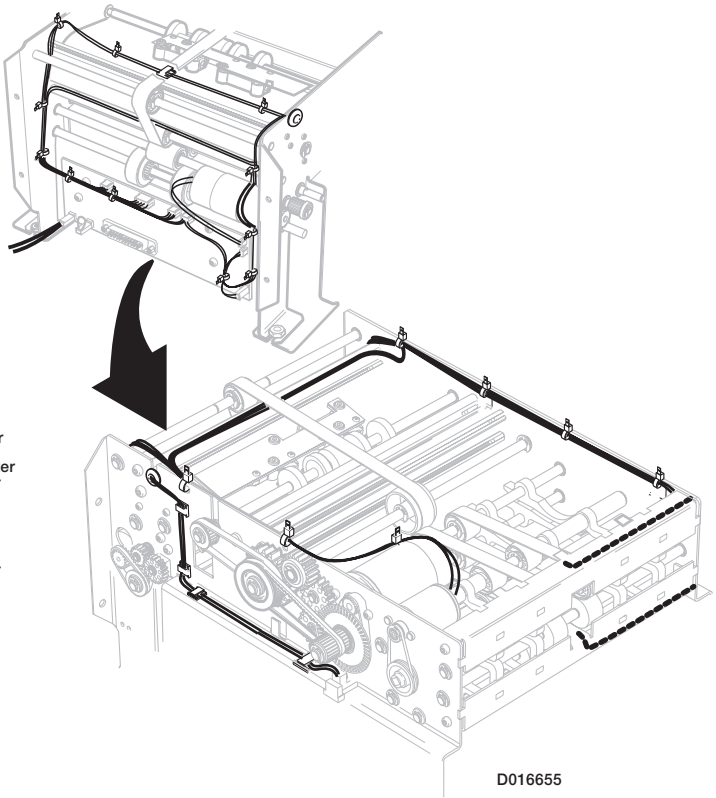
30. Fit the rem and snap on the washer.



Cabling

31. Connect the cables to the MMC board connectors and strap them.

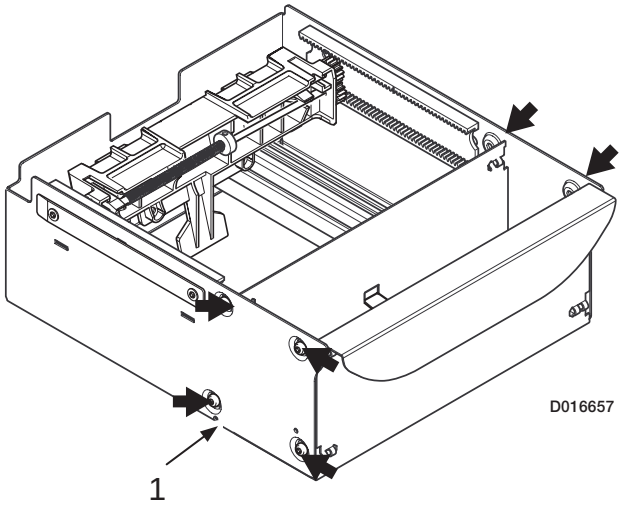




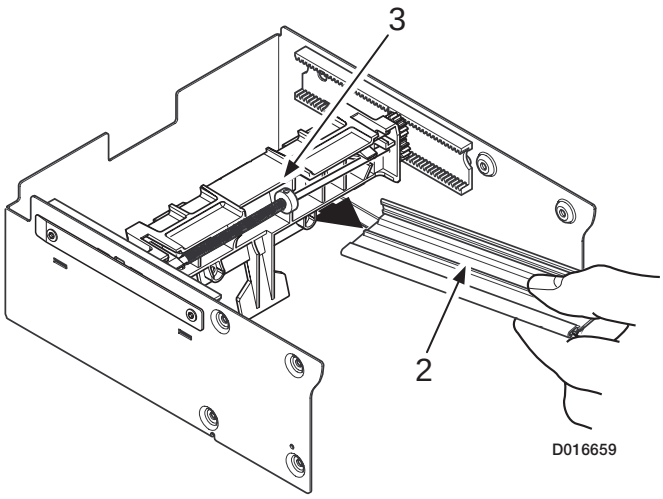
NRC 010 Tray

Removal of pusher plate

1. **Loosen and remove the screws and remove the reject pocket.**

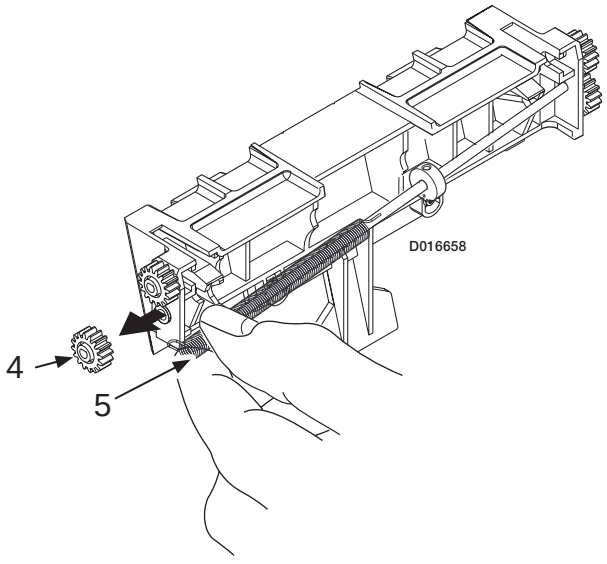


2. **Remove the note guides.**
3. **Slide out the pusher plate.**

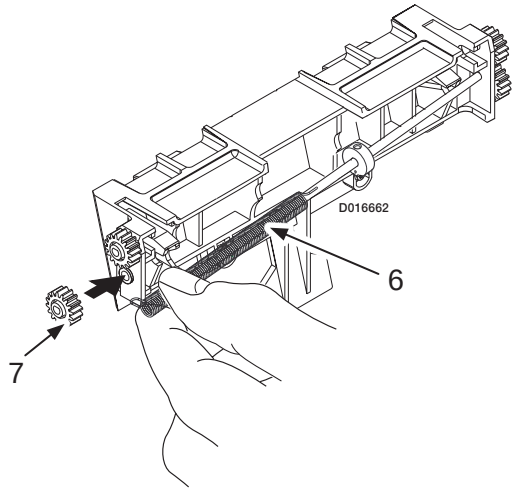


Removal of spring

4. **Remove the cogwheel.**
5. **Remove the spring.**

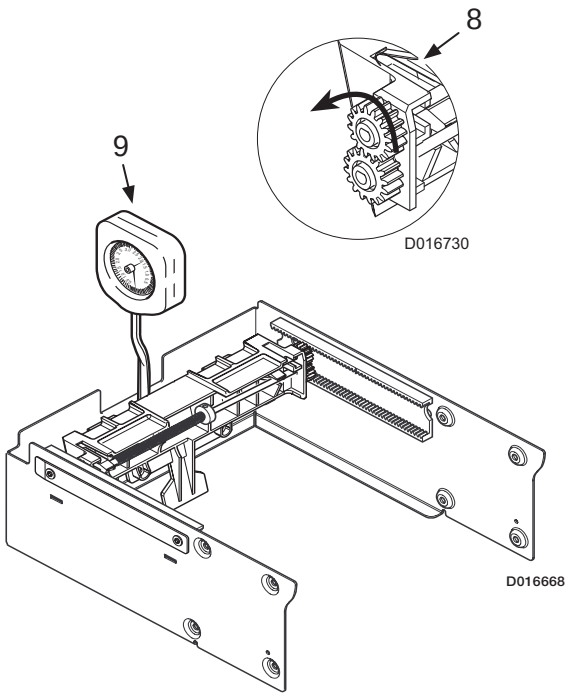


Fitting of the spring and pusher plate



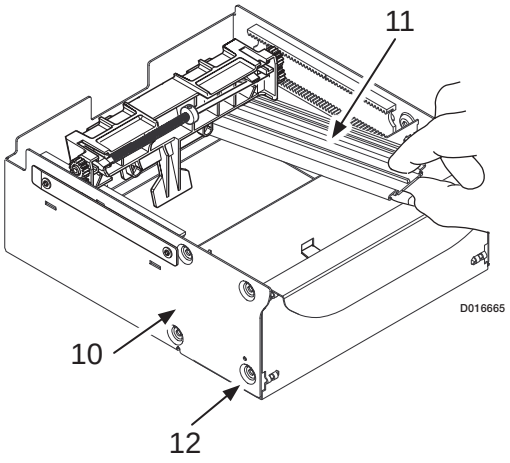
6. **Fit the spring.**

7. **Fit the cogwheel.**



8. **Wind up the spring approximately 5 turns so the force is 250g +- 10g when the pusher plate is in the home position and insert the pusher plate.**

9. **Measure the force by using Spring tension measurement tool A007123.**



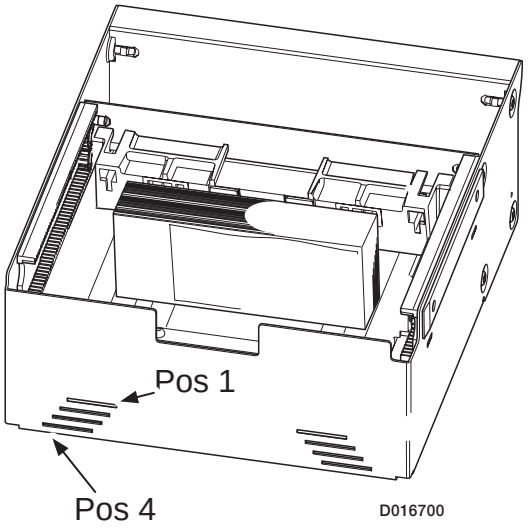
10. **Insert the reject pocket and fasten it with the upper screw first.**

11. **Fit the note guides. (See the table on page 39).**

12. **Tighten the remaining screws.**

Fit the note guides in the relevant position in accordance with the table below.

When changing to a new denomination or currency, the machine must be initiated by performing a learning note procedure. See Doc. no 8030759.



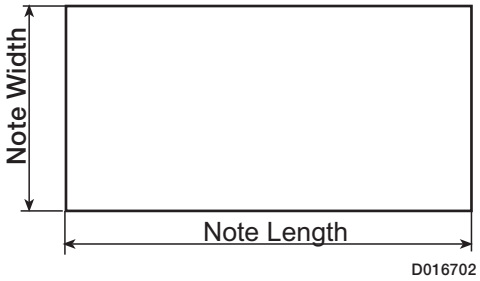


Table for Note Guide Position

	Note Length		Note width	
	Min mm	Max mm	Min mm	Max mm
Pos 1	128	157	63	68
Pos 2	136	165	68	73
Pos 3	144	173	73	78
Pos 4	152	181	78	82

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Talaris are World Experts in cash management. Across the globe 2,300 personnel, with over 130 business partners deliver technology and solutions that provide security, productivity and innovation to our customers.

The company is committed to the highest ethical standards and compliance with legislation and to be a fair employer wherever we operate. As a responsible organisation we maintain a disciplined approach to our corporate governance and operate to the optimum professional standards in all aspects of our business.

Talaris will always seek to provide a safe and productive work environment where all employees can grow and be challenged. Wherever we operate our objective is to contribute actively to the community and the local environment. An intrinsic part of our business philosophy across our product and service offerings is to be consistently environmentally responsible and to continue to improve our performance across all environmental issues wherever possible.

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MiniMech 010

Parts List

Doc. No. 8030766 / 05-EN
Date: 2009-10-20

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Preface

This manual is a Parts List for Talaris MiniMech 010.

This manual is not intended to be self-instructing.
The service engineer must have proper training before using this manual.

Different revisions are described and the reader must observe which revision the text and illustration refer to.

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Parts List - CRR protector assy. 16
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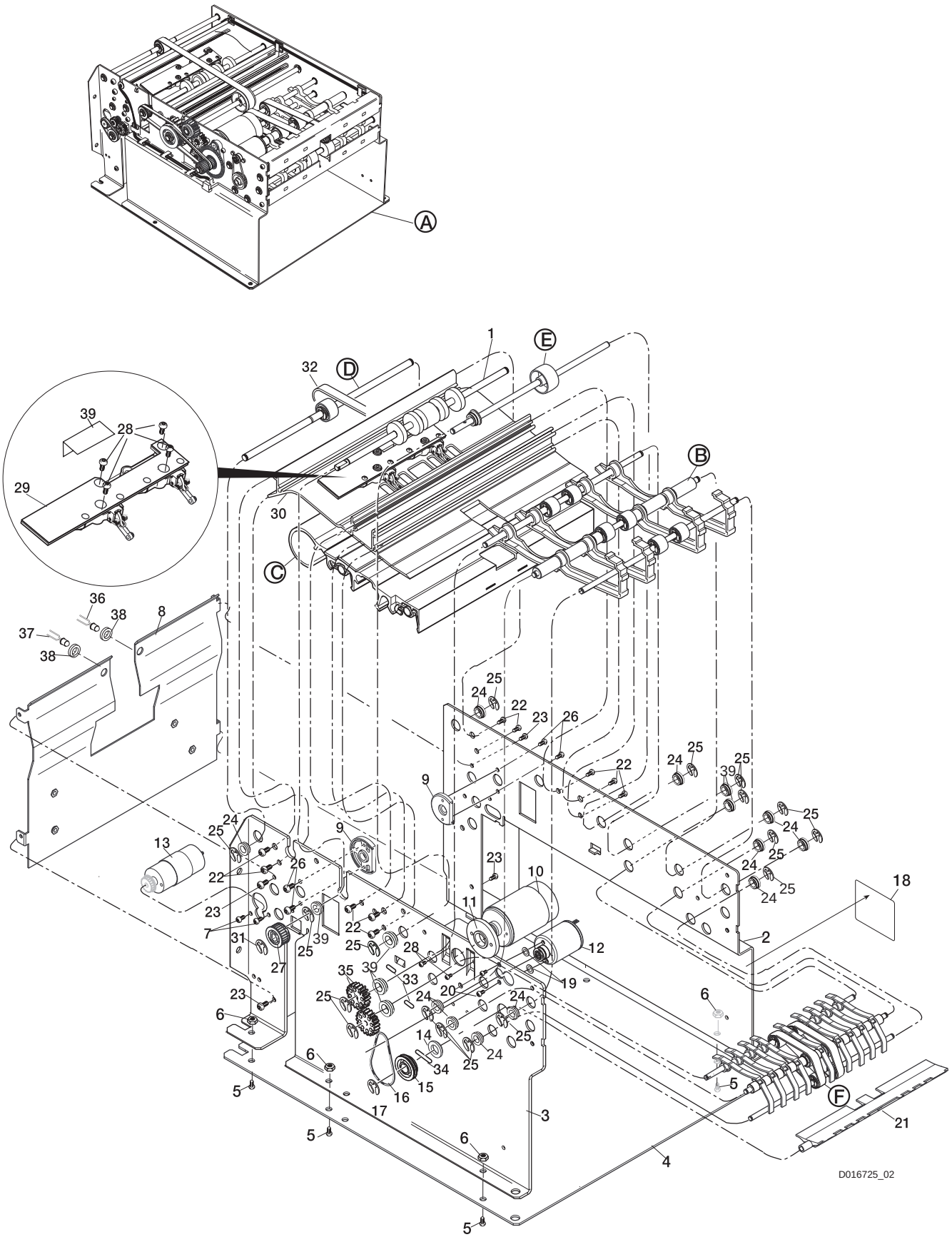
Obligations of the user

- Everyone working with the machine must read this manual.
- Observe the safety instructions and warning labels.
- Talaris or its representative should replace damaged safety devices such as fuses and warning labels immediately.

	ATTENTION
	The indication ATTENTION warns of the danger of minor physical injury or damage to equipment.
	ATTENTION
	Electrostatic sensitive device. Observe ESD precautions before handling.
	ATTENTION
	The indication WARNING warns you of the danger of serious physical injury
	DANGER TO HANDS:
	The indication warns of possible injuries to the hands. Remember, to take extra care when cover plates have been removed. Beware of fast moving mechanical parts especially when cover plates are removed. Always replace cover plates after completing work. To avoid injury, use the following precautions: Always hold the modules on the handling points, marked in green. Close carefully the safe door and covers.
	ELECTRIC SHOCKS
	The indication warns of possible injuries through electrical voltages. Improper work on the electrical components can lead to life threatening injuries from electric shocks! Unprofessional handling or incorrect connections can result in the machine no longer being safe for operation. <u>Electrical work shall only be performed by qualified personnel (electricians)!</u> Remember, to take extra care when cover plates have been removed, units disconnected, or circuit boards unplugged. The power supply contains unswitched line voltage. Never leave a part-serviced machine connected when unattended. When connecting the equipment to a 240V AC supply in the United States and Canada, it is necessary to connect via a double pole 20A circuit protector.
	WARNING:
	Due to the nature of his work, an operator or service technician may have to bypass normal safety interlocks and features to carry out some of the instructions in this manual. Always restore safety interlocks after completing work. At any risk or danger, disconnect the mains cable at the rear of the machine from the mains outlet. CAUTION; Please note that if the machine contain Lithium Batteries there is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

Parts List - MiniMech 010

Rev.	Pos.	Part No.	Description	Note
	A	MM 010	MiniMech 010, A008031	
3-13	B	A008122	Upper guide assy.	See page 6
3-13	C	A002880	Inner guide 2	See page 10
3-13	D	A008013	Roller assy 20.	see page 14
3-13	E	A008008	Wheel 28	See page 14
3-13	F	A008123	Note guide assy	See page 8
3-13	1	A007955	Shaft DD MiniMech	
3-13	2	A007979	Side plate right	
3-13	3	A007980	Side plate left	
3-13	4	A007978	Plate support	
3-13	5	A006161	Screw MFT 3X6 FZB	
3-13	6	6970102	Nut M6M3	
3-13	7	6957103	Screw MRT M3XM6 FZB	
3	8	A007974	Exit sensor sheet assy.	
4-8	8	A008339	Exit sensor sheet assy.	
3-13	8	A020351	Exit sensor sheet assy.	
3-13	9	A008394	Profile guide	
3-13	10	A007968	Main motor assy.	
3-13	11	A007959	Spacer main motor	
3-13	12	A008034	Motor assy. diverter	
3-13	13	A009399	Motor with filter	
3-13	14	A007944	Bushing diverter	
3-13	15	0400490	Pulley	
3-13	16	A008131	O-ring driving	
3-13	17	6960409	Retaining ring RS 7	
3-13	18	A008044	Label MM 010	
3-13	19	6960119	Washer BRB 2.7 X5X0.5 ST	
3-13	20	A005212	Screw MRT M2,5X4FZ	
3-13	21	A008152	Diverter	
3-13	22	A006001	Screw PT-DG 40X12 FZB	
3-13	23	6957303	Screw MRT - TT 3X6	
3-13	24	0400145	Bushing	
3-13	25	6960407	C-Clip, RS 5	
3-13	26	A002804	Screw PT-K30X6	
3-13	27	A005405	Wheel pulley assy.	
3-13	28	6957104	Screw MRT M3X8 FZB	
3-13	29	A001556	Interface NQ assy.	
3-13	30	A003393	NQ Outer guide 2	
3-13	31	6960406	Retaing ring RS 4	
3-13	32	A008004	Endless belt 10X410X0.65	
3-13	33	A002947	Pin CYL CP 1,5X10 M6 A1	
3-13	34	6900005	Pin ISO 8742 RPD 2X12	
3-13	35	A007998	Cogg wheel drive 20K	
3-13	36	A008021	Photo transistor	
3-13	37	A008020	IR Diode	
3-13	38	A006172	Grommet Ø4XØ8 for T1	
3-13	39	0405009	Bushing	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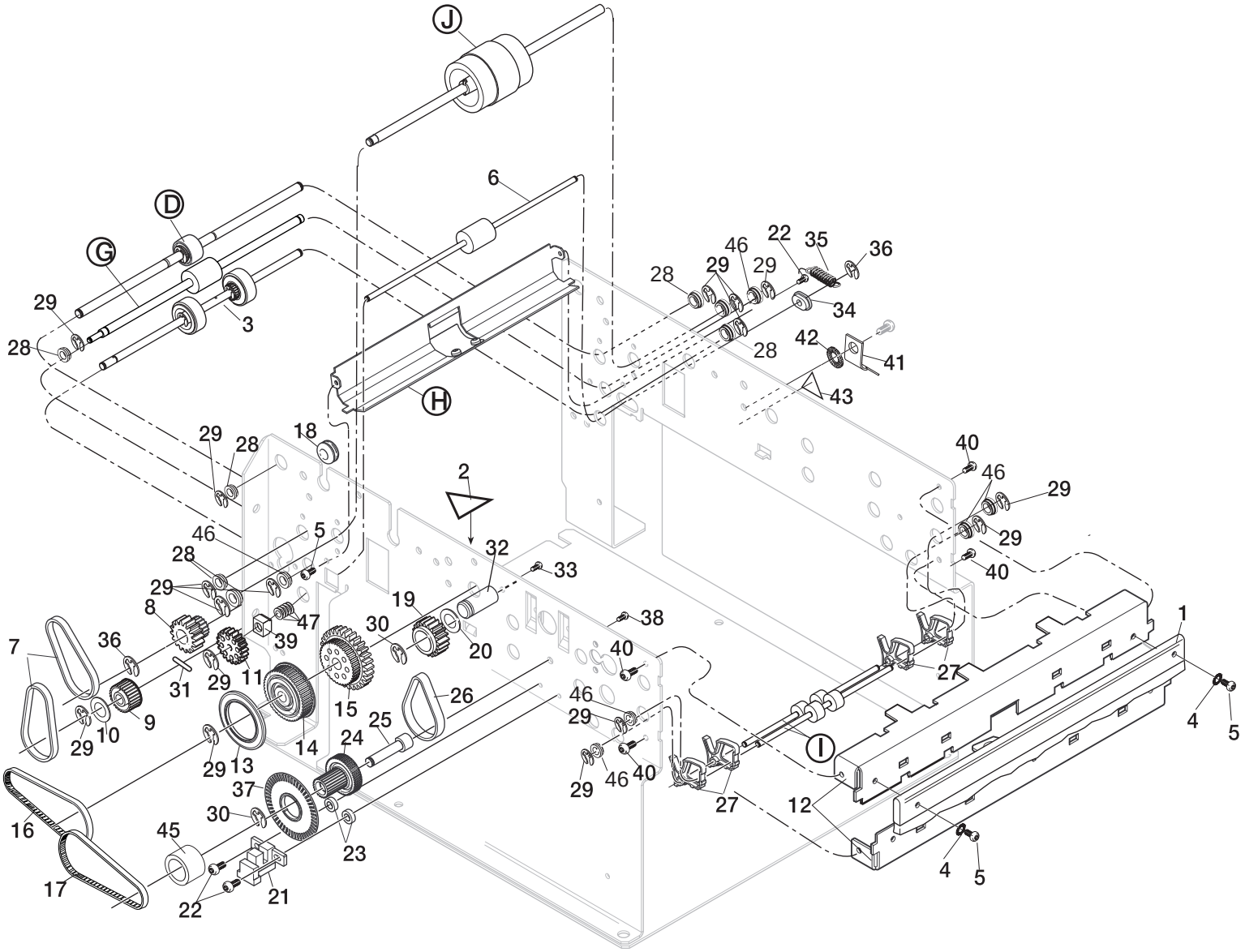
Parts List - Separation mechanism

Rev.	Pos.	Part No.	Description	Note
3-13	D	A008013	Roller assy.	See page 14
3-13	G	A007951	SEP 020	
3-13	H	A008014	CRR. Protector assy.	See page 12
3-13	I	A008012	Shaft w. rubber	See page 14
3-13	J	A008007	Shaft	See page 14
3-13	1	6590042	Static brush	
3-13	2	A007160	ESD warning label	
3-12	3	A008006	Picking shaft	
3-13	3	A020218	Picking shaft	See TB 7953237
3-13	4	6960201	Washer lock AZ 3.2	
3-13	5	6957303	Screw MRT 3X6	
3	6	A007951	CRRShaft MiniMech	
4-13	6	A008352	CRRShaft MiniMech	
3-13	7	A001616	Belt syncronous	
3-13	8	A008127	Belt wheel assy.	
3-13	9	A007946	Belt wheel 28 GT2 MR assy.	
3-13	10	A008227	Belt shield	
3-13	11	A008128	Belt wheel CCR	
3-13	12	A008141	Bracket LED	
3-13	13	A004765	Flange GT 46	
3-13	14	A001513	Pulley	
3-13	15	A007306	Pulley coggwheel	
3-13	16	A008129	Belt 2MR 190-04	
3-13	17	A008130	Belt 2MR 190-06	
3-13	18	5540021	Grommet 6X8X12X1.5	
3-13	19	A008124	Wheel	
3-13	20	1671478	Washer	
3-13	21	A003466	Pc-Board assy sensor pulse disc	
3-13	22	A008291	Screw MRT-TT 2,5X10 FZB	
3-13	23	A008038	Spacer enlis 4LG4	
3-13	24	A008125	Wheel	
3-13	25	A001494	Shaft	
3-13	26	A002762	Belt	
3-13	27	A007975	Note guide	
3-13	28	0400145	Bearing bushing	
3-13	29	6960407	C-Clip, RS 5	
3-13	30	6960406	Retaining ring RS 4	
3-13	31	A002947	Pin CYL CP1,5x10	
3-13	32	A008686	Shaft tap NMD 050	
3-13	33	6957103	Screw MRT M3X6 FZB	
3-13	34	A007949	Bushing CRR	
3-13	35	A003493	Spring CRR	
5	35	A008328	Spring CRR	
3-13	36	6960405	Retaining ring RS 3.2	
3-13	37	A001508	Disc pulse	
3-13	38	6957123	Screw MRT M4 X 8 FZB	
3-13	39	A008126	Clutch holder assy.	
3-13	40	6957303	Screw MRT-TT 3X6FZB	
3-13	41	A008336	Earth connector	
3-13	42	6960202	Washer, lock AZ 4.2	
3-13	43	A002282	Label	
3-13	44	A001616	Belt syncronous	
8-13	45	A008481	Tube	
3-13	46	0405009	Bushing	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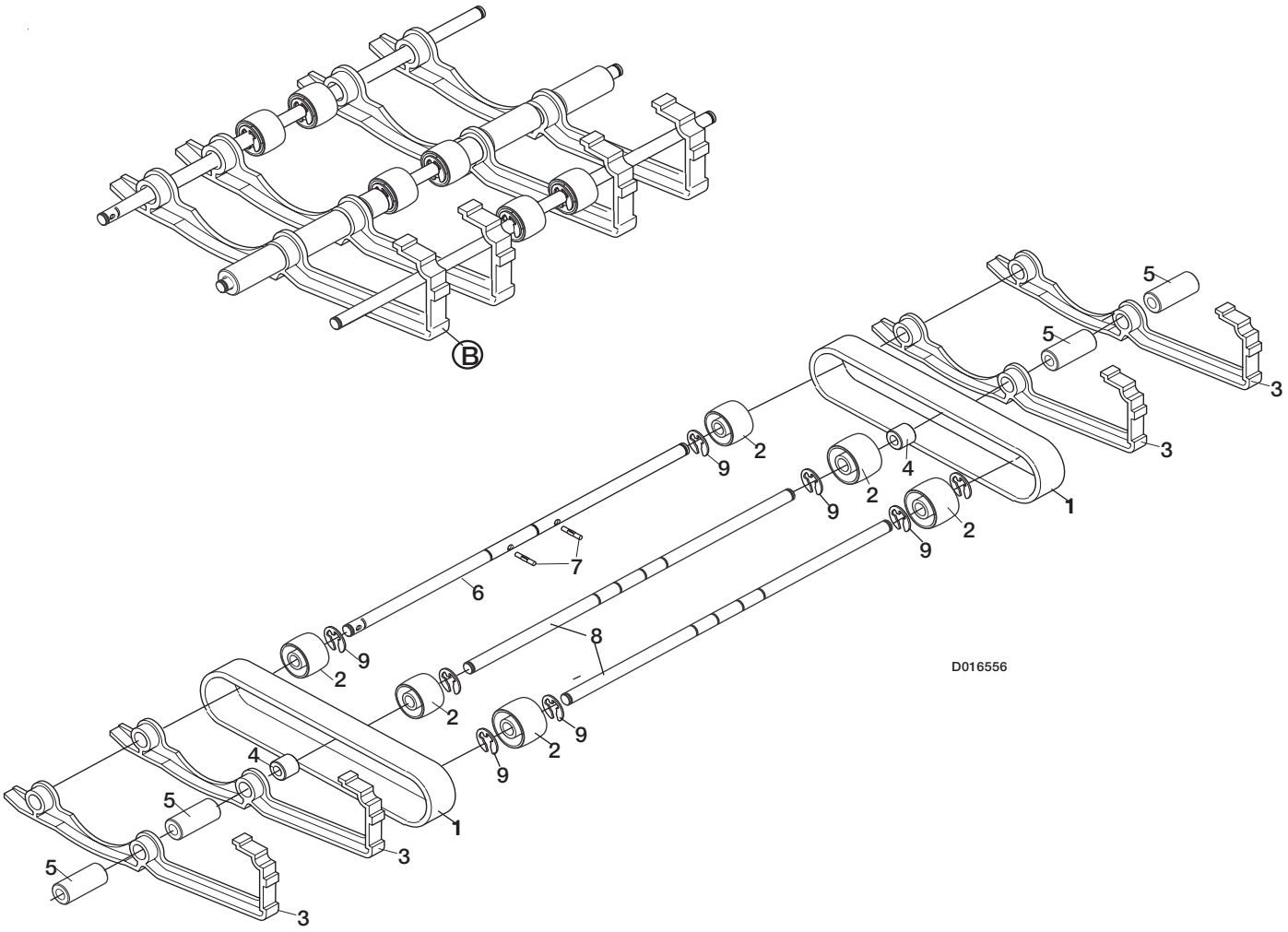
Parts List - Note guide upper assy

Rev.	Pos.	Part No.	Description	Note
3-13	B	A008122	Note guide assy. upper	
3-13	1	A008003	Endless belt semistretch	
3-13	2	A007304	Roller	
3-13	3	A007965	Note guide	
3-13	4	A008121	Spacer	
3-13	5	A008120	Spacer	
3-13	6	A007962	Shaft	
3-13	7	A007144	Pin 2x12	
3-13	8	A007969	Shaft	
3-13	9	A008537	C-clip RS5	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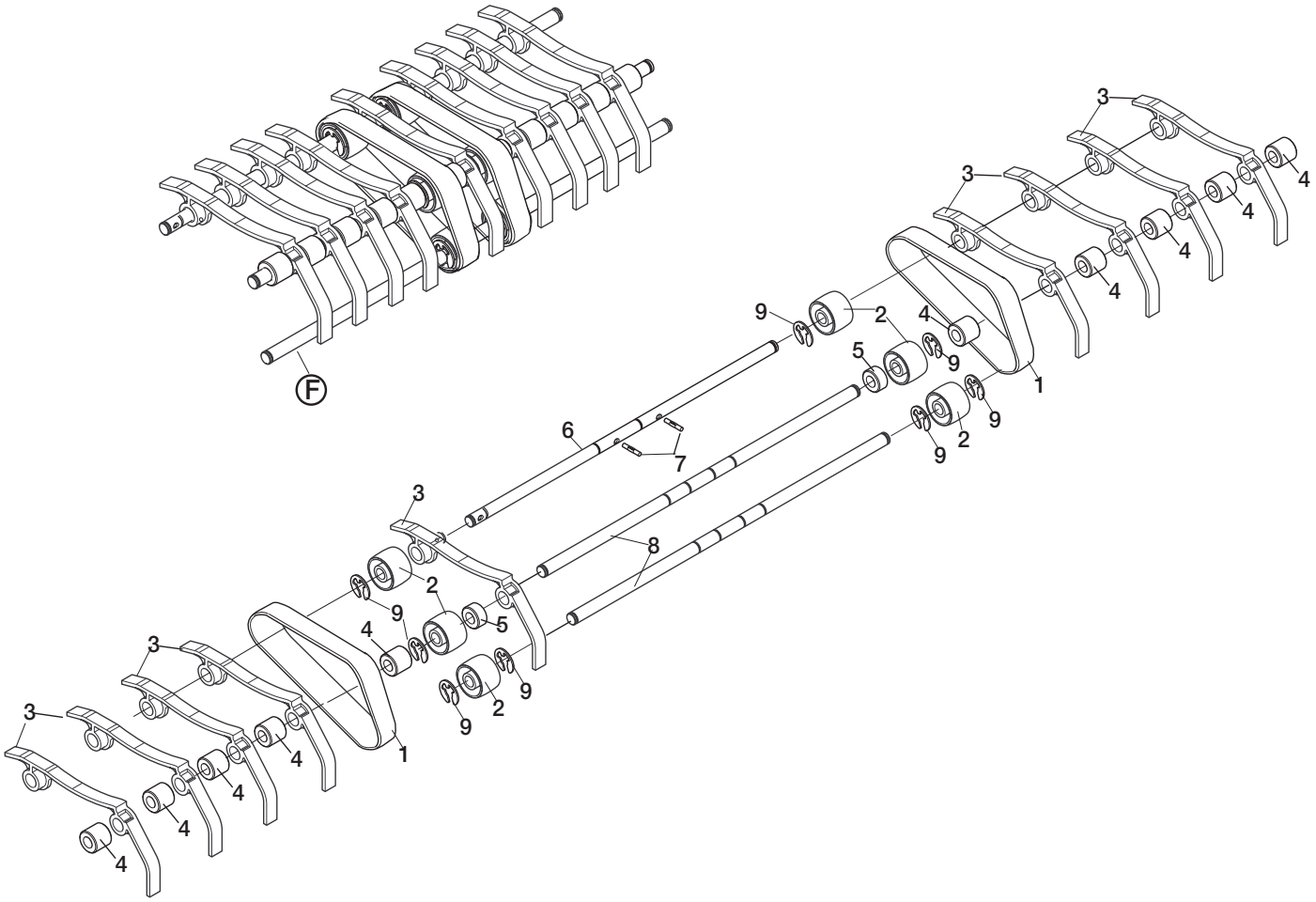
Parts List - Note guide lower assy

Rev.	Pos.	Part No.	Description	Note
3-13	F	A008123	Note guide assy.lower	
3-13	1	A008002	Endless belt semistretch	
3-13	2	A007304	Roller	
3-13	3	A007964	Note guide	
3-13	4	A008121	Spacer	
3-13	5	A008306	Spacer	
3-13	6	A007962	Shaft	
3-13	7	A007144	Pin 2x12	
3-13	8	A007969	Shaft	
3-13	9	A008537	C-clip RS5	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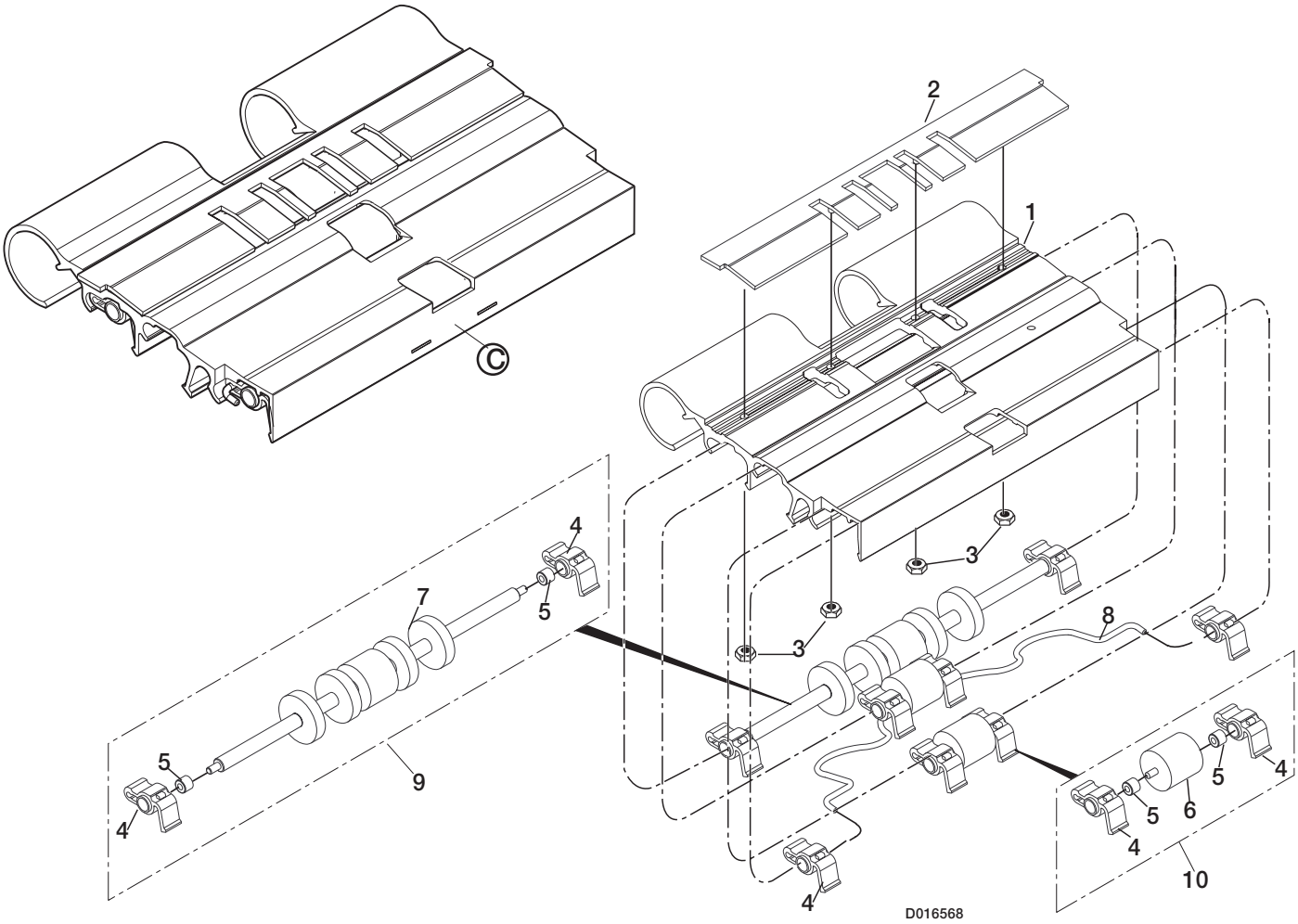
Parts List - Inner guide

Rev.	Pos.	Part No.	Description	Note
3-13	C	A002880	Inner guide	
3-13	1	A004544	Inner guide	
3-13	2	A001504	NQ measure plane	
3-13	3	6970102	Nut M6Xm3	
3-13	4	A002969	Attachment, bearing	
3-13	5	A001630	Bearing	
3-13	6	A008456	Roller	
3-13	7	A004543	Roller lower	
3-13	8	A001505	Lock	
3-13	9	A001527	Shaft	
3-13	10	A001496	Shaft	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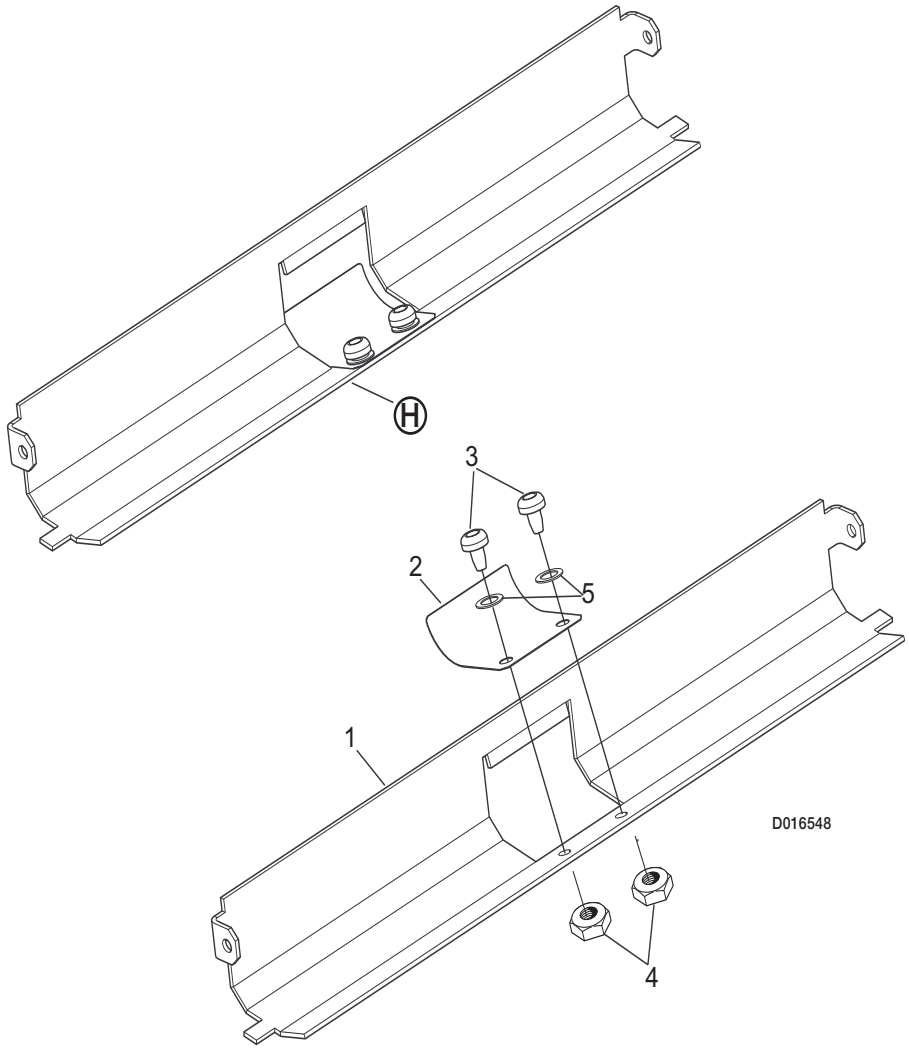
Parts List - CRR protector assy.

Rev.	Pos.	Part No.	Description	Note
3-13	H	A008014	CRR protector assy.	
3-4	1	A007977	CRR guide	
5-13	1	A008362	CRR guide	
3	2	A007976	CRR cover	
4-13	2	A008353	CRR cover	
3-13	3	A005212	Screw MRT-TT 3x5	
3-13	4	6970101	Nut MRT M2,5X 4 FZB	
3	5	A005368	Washer	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Parts List - Rollers

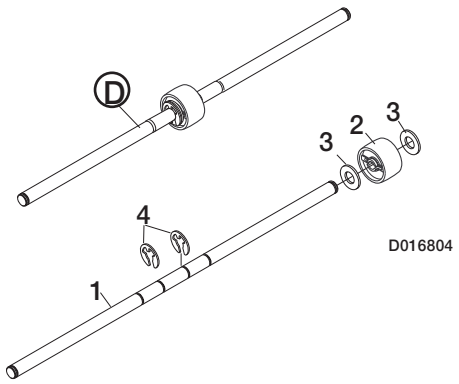
Rev.	Pos.	Part No.	Description	Note
3-13	D	A008013	Roller 20 assy.	
3-13	1	A007969	Shaft reject inlet	
3-13	2	A007304	Roller	
3-13	3	6960179	Washer 6,5x12x1	
3-13	4	A008537	C-clip RS5	

Rev.	Pos.	Part No.	Description	Note
3-13	E	A008008	Wheel 28	
3-13	1	A007954	Shaft wheel	
3-13	2	A007144	Pin 2x12	
3-13	3	A001533	Wheel	
3-13	4	6960407	C-clip RS	
3-13	5	0400145	Bearing bushing	

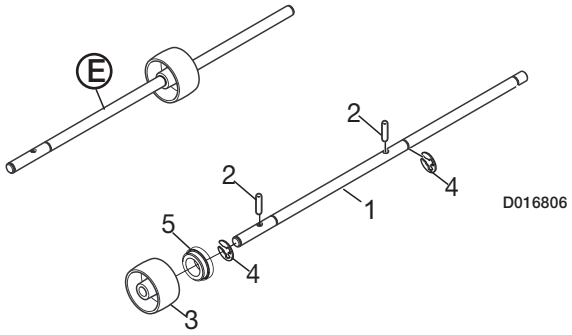
Rev.	Pos.	Part No.	Description	Note
3-13	I	A008012	Shaft w. rubber	
3-13	1	A007969	Shaft reject inlet	
3-13	2	A008032	Rubber	

Rev.	Pos.	Part No.	Description	Note
3-13	J	A008007	Shaft	
3-13	1	A007961	Shaft Prism	
3-13	2	6900254	Spring pin	
3-13	3	A001551	Prismatic assy.	
3-13	4	6960407	C-clip RS 5	

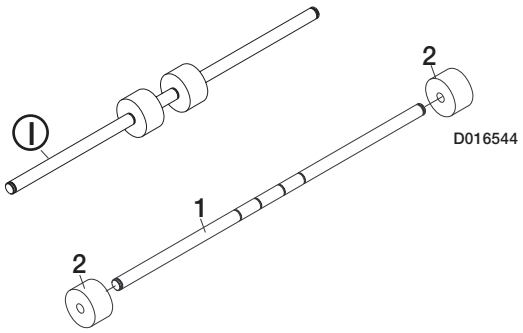
Shaft reject inlet



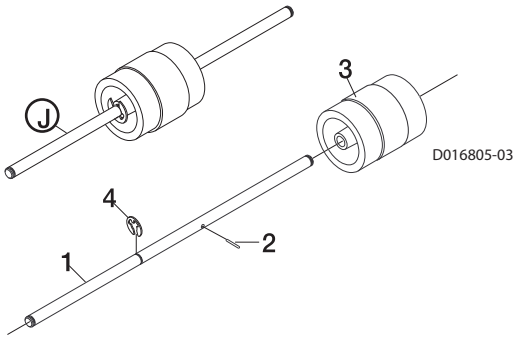
Wheel 28



Shaft with rubber

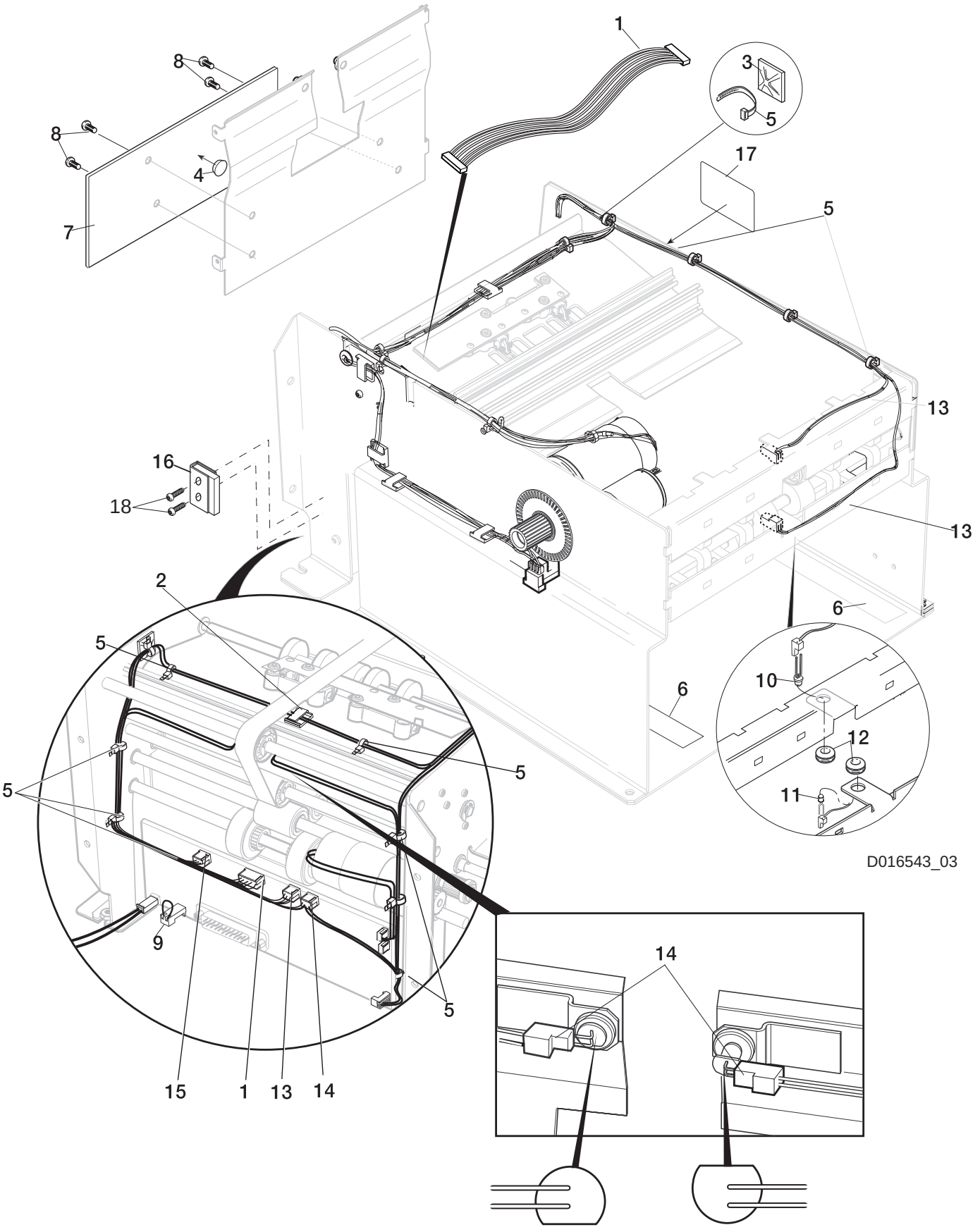


Shaft



Parts List - Cables

Rev.	Pos.	Part No.	Description	Note
3-13	1	A008133	Cable MiniMech-D-D	
3-13	2	A007387	Clip	
3-13	3	6580020	Mount, harness	
3-13	4	6530007	Rubber foot	
3-13	5	6580001	Band	
3	6	A006005	Tape teflon	
4-13	6	A008337	Tape teflon	
3	7	A007981-02	MMC 010	
4-5	7	A007981-03	MMC 010	
4-6	7	A007981-04	MMC 010	
4-7	7	A007981-05	MMC 010	
4-8	7	A007981-07	MMC 010	
3-13	7	A011258	MMC 020	
3-13	8	6957304	Screw MRT-TT 3x8	
3-13	9	A008135	Jumper	
3-13	10	A008020	IR Diode	
3-13	11	A008021	Phototransistor	
3-13	12	5540021	Grommet	
3-13	13	A008134	Cable MiniMech throat sensor	
3-13	14	A003269	NSC Entry sensor cable	
3-13	15	A008132	Cable MiniMech	
3-12	16	A007340	Catch magnet	
3-13	16	A020284	Catch magnet	
3-13	17	A008044	Label status	
13	18	6957307	Screw MRT-TT 3x16	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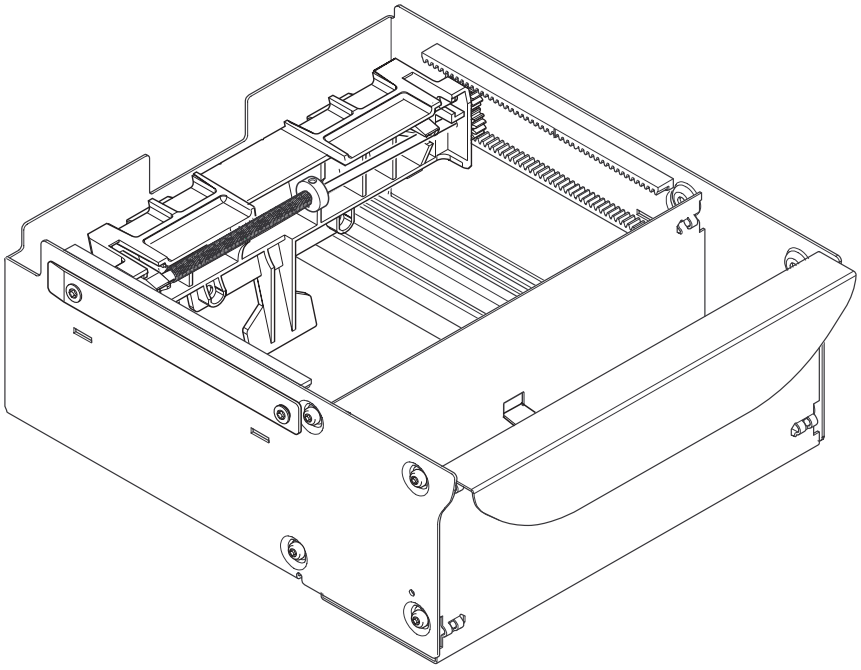
MiniMech 010

NRC 010

Parts List

Level 2



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Doc. No. 8030761 / 04-EN
Date: 2009-10-20

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Preface

This manual is a Parts List for Talaris Note and Reject Cassette, NRC 010.

This manual is not intended to be self-instructing.
The service engineer must have proper training before using this manual.

Different revisions are described and the reader must observe which revision the text and illustration refer to.

Contents

Preface **3**

Obligations of the user **5**

Parts List - NRC 010 6

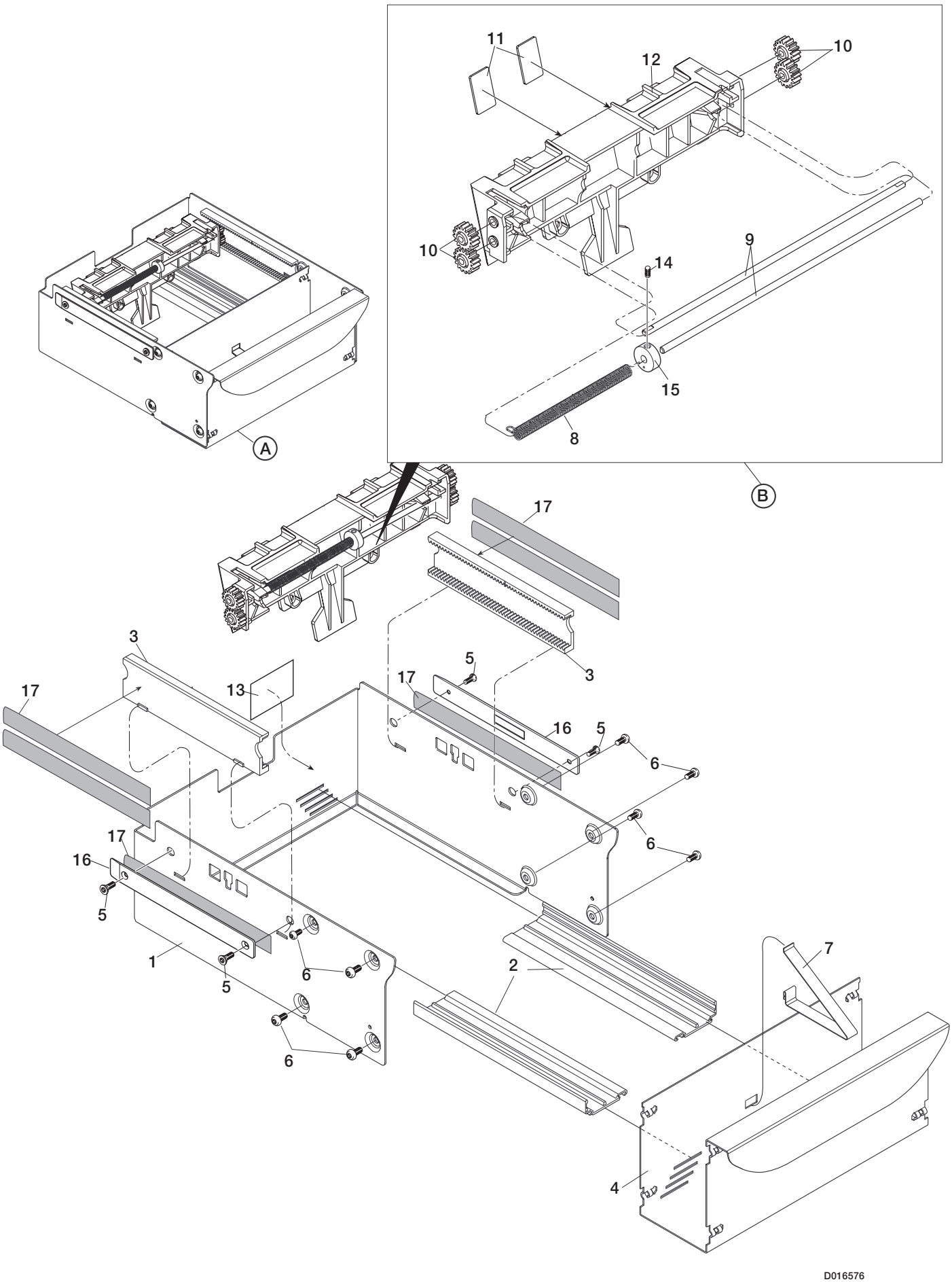
Obligations of the user

- Everyone working with the machine must read this manual.
- Observe the safety instructions and warning labels.
- Talaris or its representative should replace damaged safety devices such as fuses and warning labels immediately.

	ATTENTION
	The indication ATTENTION warns of the danger of minor physical injury or damage to equipment.
	ATTENTION
	Electrostatic sensitive device. Observe ESD precautions before handling.
	ATTENTION
	The indication WARNING warns you of the danger of serious physical injury
	DANGER TO HANDS:
	The indication warns of possible injuries to the hands. Remember, to take extra care when cover plates have been removed. Beware of fast moving mechanical parts especially when cover plates are removed. Always replace cover plates after completing work. To avoid injury, use the following precautions: Always hold the modules on the handling points, marked in green. Close carefully the safe door and covers.
	ELECTRIC SHOCKS
	The indication warns of possible injuries through electrical voltages. Improper work on the electrical components can lead to life threatening injuries from electric shocks! Unprofessional handling or incorrect connections can result in the machine no longer being safe for operation. <u>Electrical work shall only be performed by qualified personnel (electricians)!</u> Remember, to take extra care when cover plates have been removed, units disconnected, or circuit boards unplugged. The power supply contains unswitched line voltage. Never leave a part-serviced machine connected when unattended. When connecting the equipment to a 240V AC supply in the United States and Canada, it is necessary to connect via a double pole 20A circuit protector.
	WARNING:
	Due to the nature of his work, an operator or service technician may have to bypass normal safety interlocks and features to carry out some of the instructions in this manual. Always restore safety interlocks after completing work. At any risk or danger, disconnect the mains cable at the rear of the machine from the mains outlet. CAUTION; Please note that if the machine contain Lithium Batteries there is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

Parts List - NRC 010

Rev	Pos	Part No.	Description	Notes
1	Ⓐ	NRC 010	NRC 010, A008030	
5	Ⓐ	NRC 010	NRC 010, A008322	
1-2	Ⓑ	A008050	Pusher plate assy.	
3-5	Ⓑ	A008334	Pusher plate assy.	
1	1	A008026	Side plate MiniMech	
2-5	1	A008319	Side plate MiniMech (WW)	
1	2	A008029	Note guide	
2-5	2	A008321	Note guide MiniMech (WW)	
1-2	3	A008028	Cog segment	
3-5	3	A008332	Cog segment	
1	4	A008052	Reject plate MiniMech	
2-5	4	A008320	Reject plate MiniMech (WW)	
3-5	5	A002833	Screw PT - K25X6 FZB	
1-5	6	6957325	Screw MRT-TT 4x12	
1-5	7	A008103	Spring guide	
1-5	8	A008022	Spring	
1-2	9	A004392	Shaft	
3-5	9	A008329	Shaft	
1-5	10	A008360	Gear	
1-5	11	A004458	Sticker	
1-2	12	A008025	Pusher plate	
3-5	12	A008333	Pusher plate worked	
1-5	13	A008043	Label	
1-5	14	A006004	Screw SK6SS 3X4	
1-5	15	A008023	Stop spring	
1-2	16	A008289	Runner	
3-5	16	A008143	Guide	
1-2	17	A008277	Tape	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Recommended spare parts

MM 010

To establish a high level of service, this is the minimum of parts / kits to be stored in workshop and used for replacement of failing units.

Part No	Description	No of parts per 100 installed units
A007968	Main motor assy	10
A008034	Motor assy Diverter	10
A004824	Motor with filter	10
A008131	O-ring driving	10
A001556	Double detect assy	10
A008004	Endless belt 10x410x0,65	10
A008129	Belt 2MR 190-04	10
A008130	Belt 2MR 190-0,6	10
A003466	Pc-board assy, sensor pulse disc	10
A001508	Pulse disc	10
A008002	Endless belt semistretch	10
A008003	Endless belt semistretch	10
A008133	Cable MM double detect	10
A007981-02	PCB assy	10
A008020	IR diod	10
A008021	Photo transistor	10
A008134	Cable MM throat sensor	10
A003269	NSC Entry sensor cable	10
A008132	Cable MiniMech	10

Doc. No. 8030765/02–EN
Date 2009-03-26

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MINIMECH™

Communication & Command reference manual
2011-02 code

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1 INTRODUCTION

1

1.1 Purpose

This document describes the application, session, data link and physical layer of the communication protocol implemented in the MINIMECH™.
The protocol is an emulation of the 1700 Series Single Denomination Dispenser (SDD) firmware with exceptions described in appendix A.
The document is intended as a reference for system analysts and developers involved in the task of integrating MINIMECH™ into dispensing automation products.

1.2 Overview

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1.3 Versions

This document is valid from the following firmware configuration.

MMC	2011-02.03 and later

1.4 Definitions and Conventions

1.4.1 Firmware version code

The six digit Firmware Version code, XXXX-YY.ZZ, is explained and changed as follows:

XXXX = Program Type. The two last digits indicate the module, hardware compatibility and functionality of the firmware.
XXXX= 2011 for MINIMECH™ Machine Controller firmware.

YY = Version Number. This number changes when new features or major functional changes have been made
For example:
New format of Command or Reply.
Limited function of Command.
Not compatible with old hardware or if the program is not compatible because of other major changes.

ZZ = Revision Number Changed when the program has been updated or corrected. The release is fully compatible with previous revisions

1.4.2 Conventions in this Manual:

Throughout this manual we will refer to standard ASCII characters enclosing them within brackets, meanwhile their internal hexadecimal value will be represented between inverted commas preceded by letter X.

Example:
The character combination 0A (zero and a letter A)

Hex. Value.....X'30'X'41'

1.4.3 Vocabulary

ATM	Automatic Teller Machine
MMC	MINIMECH™ Machine Controller
FW	Firmware
Host	The external device where the application for the MINIMECH™ is executed. The host can be any type of Terminal controller or a Personal Computer.
MINIMECH™	The Mini-mechanism from Talaris
Note	A "note" is, besides banknote, also referred to other documents as value documents etc. that is handled by the MINIMECH™.
NQ	Note Qualifier
PS	Power Supply
SDD	Single Denomination Dispenser

=

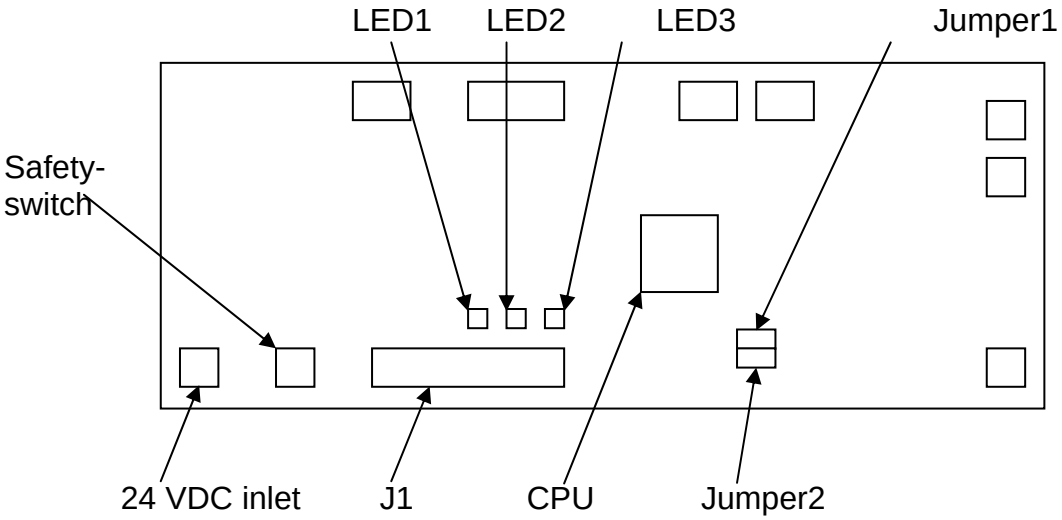
2 PHYSICAL DESCRIPTION

2

2.1 System Structure

The standard MINIMECH™ configuration consists of a Controller with Firmware (MMC & FW), a Note Feeder, a Note Qualifier, a Note Transport, a Note Diverter, a Note tray with integrated Reject compartment and a Note Output unit.

2.2 The MMC Machine Controller



This is a simple picture of the machine controller.
The MMC PCB is a four layer, microcontroller based board. J1 is a RS232C serial communication interface. There are three LEDs on the MMC. They are used to indicate different modes during machine operation. The MMC has three different motordrivers and four different sensor I/Os. They are all used under normal operation to drive the mechanics and for supervision of the note processing.

Two jumpers are provided for setting of custom configuration parameters for the serial communication interface and as a quick way to enter the learning-notes mode.

2.3 Jumper settings on MMC

There are two positions on the MMC where jumpers can be placed. They are called Jumper 1 and Jumper 2. (Square IC with 44 pins)

A change in the jumper setting does only have effect during system boot.

2.3.1 Jumper 1 (Custom configuration)

The default communication settings in the MINIMECH™ are a baudrate of 4800 BPS and even parity. If a different setting is required it should be changed with item 115 and 116 described in chapter 6.2.

If Jumper1 **is open** during system boot, the system will always run with default values. (4800 BPS and Even parity)

If jumper1 **is closed** during system boot, the system runs with values set with item 115 and 116.

2.3.2 Jumper 2 (Activate Learning-notes mode)

Jumper 2 is used to clear the part of the non-volatile memory in the MINIMECH™ which keeps the length and thickness data of the notes currently known by the machine.

When the note-data is cleared, the machine will enter Learning-notes mode. This mode is indicated on the three LEDs on the MMC machine controller. All three LEDs are flashing together in parallel at a frequency at about 3 Hz. When the MINIMECH™ has entered the Learning-notes mode, the machine is ready to learn new note length and thickness in a Learning-note sequence described in chapter 2.4.

When the status of Jumper 2 is **changed** before a system boot, the machine will clear the note data during boot and enter Learning-notes mode.

The meaning of change is: If Jumper 2 was **closed** at the time for the last boot, it should be **open** for the next boot of the MINIMECH™. And if Jumper 2 was **open** at the time for the last boot, it should be **closed** for the next boot of the machine.

NOTE! It is also possible to enter the Learning-notes mode by a software command. The software command is WD/392/0 and is described in chapter 4.4 under the command Write Data.

2.4 Learning-notes sequence

The Learning-notes mode is activated the very first time the machine is booted, and then with the software command WD/392/0 or by a change of Jumper 2 (takes effect during the next boot).

Once in the Learning-notes mode, the Learning-notes sequence should be started.

- Make sure there are notes with adequate quality in the note tray.

- Make sure the reject compartment is empty.

- Issue a Dispense command with one note as argument (X'42'X'21') or a Test dispense command with one note as argument (X'43'X'21'). It is possible to start the learning-notes sequence with a Dispense command with more than one note as argument, but it is **NOT** recommended. Verification of correct learning-note sequence is easier with only one note requested.

If the command issued was a Dispense, the first five notes will be rejected and the rest will be dispensed. But if the command was a Test dispense, the machine will feed six notes and all of them will be rejected.

- Verify the reply from the machine.

If the command was a Dispense with one note as argument, the reply should be X'42'X'20'X'21'X'25', meaning a Dispense (X'42') with no error (X'20') and one note dispensed (X'21') and five rejects (X'25').

If the command was a Dispense with more than one note requested, the counters in the reply should show correct numbers according to the number of notes requested in the command and the numbers of notes dispensed and rejected.

If the command was a Test dispense the reply should be X'43'X'20'X'20'X'26', meaning a Test dispense (X'43') with no error (X'20') and no notes dispensed (X'20') and six rejects (X'26').

- Verify there are five notes in the reject compartment and one note dispensed if the command was Dispense with one note as argument. Verify there are six notes in the reject compartment and no notes dispensed if the command was Test dispense.

If the numbers of notes rejected and dispensed are correct according to above, the Learning-notes sequence was successful. If not, go back and put the machine in Learning-notes mode and perform a new Learning-notes sequence.

2.5 Interpretation of MMC LEDs

There are five different modes in the MINIMECH™ which are shown by the three LEDs on the MMC machine controller.

They are:

- First double detect calibration

All three LEDs are lit constantly during the first seconds during machine boot. The machine will receive and acknowledge a command immediately during this mode. But the command will not be executed until the calibration is ready.

- Learning-note mode

All three LEDs are flashing together in parallel at a frequency at about 3 Hz. The machine waits for a dispense or a test dispense command to start the Learning-note sequence.

- Machine in idle mode waiting for new command

This mode is indicated by a running-light. The light runs from left to right and then from right to left and then from left to right and so on. This indication says everything is normal and no errors detected and the machine is ready for a new command.

- Machine working

When the MINIMECH™ is working and busy it starts to toggle the light between the first and the second led with a frequency at about 1 Hz. The machine doesn't accept any new command and a reply will be sent from the machine when the current work is ready.

- Error detected

If some kind of error is detected in the machine, an internal error-code is set and then mapped into a adequate status code for the situation. The status codes are described in chapter 5. But for more detailed information about a error situation the three LEDs are flashing the internal error-code causing the status code from the machine. The internal error code sequence on the LEDs are trigged by all three LEDs are lit in about 1 sec. Then are the number of tenth flashed on the first led and the number of ones flashed on the second led.

Example:

Internal error-code 42 (TRANSPORT_START_ERROR) will give the result of 4 flashes with LED1 and 2 flashes with LED2.

NOTE! The internal error-code 42 will be mapped into X'2A', Transport Error, in the status byte in the reply to the host.

3 LOGICAL DESCRIPTION

3

3.1 Dialogue procedures

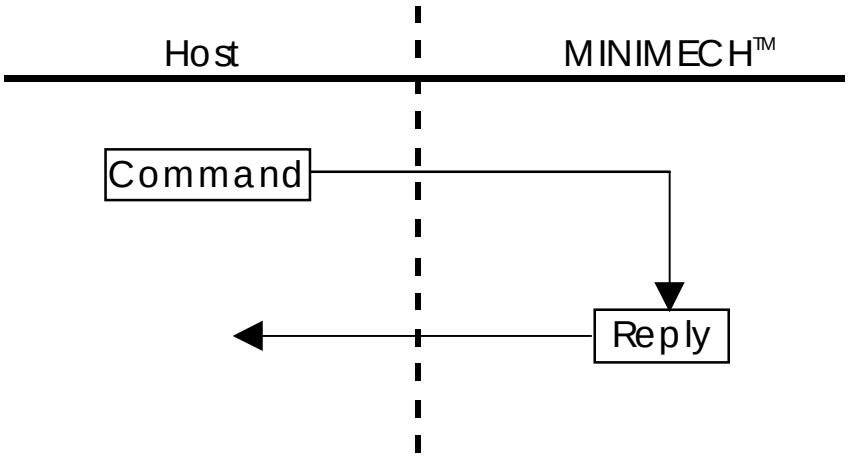
The MINIMECH™ Controller is designed to operate under the control of an external device. We will refer to this device as the host.
From the logical point of view, the MINIMECH™ Controller cannot perform any operation without receiving a COMMAND from the host.

After receiving a COMMAND, the MINIMECH™ Controller will try to execute it, sending back to the host the adequate REPLY, regardless of whether the operation has been successfully executed or not. There is always a reply for each command, except for the hardware reset command that restarts the firmware and doesn't send a reply.

On the other hand, the MINIMECH™ will never send any message to the host, unless it had been previously activated by receiving a command.

The dialogue procedure between the MINIMECH™ and the host is always established in PAIRS OF MESSAGES, which must be initiated always from the host.

Figure 3.1: Dialogue procedure



3.2 Commands overview

Possible commands available to handle the MINIMECH™ are listed below. However, not all of them are strictly required for common operation at the user site. Each one of the commands is identified by an operation code, 1 byte long, in Hex code.

For everyday normal operation, only 1 command is strictly required. That is:

X'42' ……. DISPENSE

Later on, each transaction will imply sending an order to dispense the notes and deliver it to the teller, that's to say, issuing the X'42' DISPENSE command.

Other movement commands can be:

X'41' ……..…. PURGE
X'43' ……..…. TEST DISPENSE
X'4A' ……..…. SINGLE NOTE DISPENSE
X'4B' ……..…. SINGLE NOTE EJECT

As service commands, the following can be used:

X'40' ……..…. STATUS
X'44' ……..…. RESET
X'45' ……..…. LAST STATUS
X'46' ……..…. CONFIGURATION STATUS
X'47' ……..…. DOUBLE DETECT DIAGNOSTICS
X'48' ……..…. SENSOR DIAGNOSTICS
X'54' ……..…. TEST MODE
X'52' X'44'…….. READ DATA
X'57' X'44' ……. WRITE DATA

3.3 Reply message overview

As stated in paragraph 3.1, the dialogue procedure between the MINIMECH™ and the host, is established in pairs of messages. That means that each one of the commands issued to the system will send its own REPLY MESSAGE back to the host.

In general terms, each reply message contains three different types of information:

Command code
Status code
Information data

The *Command code* is the hex value for the command producing this reply.

The *Status code* tells the host what the final result of the command has been. It is a 1 byte hex coded value.

The I*nformation data*, when necessary, gives detailed information as required by the corresponding command.

A detailed analysis of the different S*tatus codes* and *Information data* will be done later on in this manual.

NOTE! There is one command that doesn't have a reply. It is the X'44' RESET command that is a full hardware reset and only makes an ACK for the incoming command.

4 COMMAND AND REPLY STRUCTURE

4

4.1 Data transmission

Communication between the MINIMECH™ and the external host is performed through a standard V.24 port.

As we already have stated, the dialogue procedure is always performed in the same simple way: pairs of COMMAND-REPLY messages. Optionally using the standard V.24 timing signals. Detailed information about ASCII character set and signal timing see section 6.

4.2 Message format

All commands (from the host) and all responses (from the MINIMECH™) are on a one-to-one basis. That is, the MINIMECH™ must reply to a message before another command will be accepted, and the MINIMECH™ cannot send an unsolicited response.

Messages are accepted by the transmission of ACK (ACKnowledged) or rejected by the transmission of a NAK (Not AcKnowledged) character. A NAK is a request for the message to be repeated.

The general message transfer procedure is as follows:

HOST	Transmit command
MINIMECH™	Accept command by sending ACK (ASCII 06 hex)
MINIMECH™	Action the command
MINIMECH™	Transmit response
HOST	Accept response by sending ACK
MINIMECH™	Transmit EOT (ASCII 04 hex), ends communication

4.3 Commands overview

Possible commands available to handle the MINIMECH™ are listed below. Each one of the commands is identified by an operation code, 1 byte long, in Hex code. Below follow a list with a full set of commands available and recommended time outs in application program.

OP. CODE	MNEMONIC	COMMENTS	TIMEOUT
X'40'	STATUS	The Status command instructs the dispenser to return its current sensor and operational status.	10 sec
X'41'	PURGE	The Purge command instructs the dispenser to remove all documents from the transport. The documents are transported to the reject note tray or through the delivery throat.	120 sec
X'42'	DISPENSE	The Dispense command instructs the dispenser to pick a specified number of documents from the note tray and transport them to the delivery throat.	120 sec
X'43'	TEST DISPENSE	The Test Dispense command instructs the dispenser to dispense a specified number of notes into the reject area.	NOM=ëÉÅ
X'44'	RESET	The Reset command instructs the dispenser to enter its power–up condition.	-
X'45'	LAST STATUS	The Last Status command instructs the dispenser to repeat the last operation completion status, i.e. the last Purge, Dispense or Test dispense status.	10 sec
X'46'	CONFIGURATION STATUS	The Configuration Status command instructs the dispenser to send its firmware and mechanical configuration.	10 sec
X'47'	DOUBLE DETECT DIAGNOSTICS	The double detect diagnostics command instructs the dispenser to operate its transport and feed system and report the idle average measurement of the mechanical reference plate under the arms in the double detect.	120 sec
X'48'	SENSOR DIAGNOSTICS	The sensor diagnostics command returns data concerning direct measurements of document thickness and length.	NOM=ëÉÅ
X'4A'	SINGLE NOTE DISPENSE	The Single Note Dispense command instructs the dispenser to pick one note and stop with the note protruding from the delivery throat.	120 sec
X'4B'	SINGLE NOTE EJECT	This command may be used after a Single Note Dispense to instruct the MINIMECH™ to drive the note held at the delivery throat fully out to the customer.	120 sec
X'52' X'44'	READ DATA	The Read data command is used to read data from the MINIMECH™ internal data structures.	NM=ëÉÅ
X'57' X'44'	WRITE DATA	The Write data command is used to write data to the MINIMECH™ internal data structures.	NM=ëÉÅ
X'54'	TEST	This command can be used to verify correct operation of the systems mechanics, hardware and software.	120 sec

4.4 Commands and replies description

Under this heading, it will be described in full detail, each one of the different commands available for the MINIMECH™, as well as the different reply messages, which can be sent to the host from the MINIMECH™.

A reference will be made of the different status codes, which can appear in each one of the commands, however, full description of those status will be given in Section 5 of this Reference Manual.

In this section there will be references to the following two groups of commands:

Movement Commands:

X'41'	PURGE
X'42'	DISPENSE
X'43'	TEST DISPENSE
X'47'	DD DIAGNOSTICS
X'4A'	SINGLE NOTE DISPENSE
X'4B'	SINGLE NOTE EJECT
X'54'	TEST MODE

Non-Movement Commands:

X'40'	STATUS
X'44'	RESET
X'45'	LAST STATUS
X'46'	CONFIGURATION STATUS
X'48'	SENSOR DIAGNOSTICS
X'52' X'44'	READ DATA
X'57' X'44'	WRITE DATA

Command X'40' STATUS

Command Message String:

T I S C E B

Where:
T = Start of Transmission X'04'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'40'
E = End of text X'03'
B = BCC

Reply Message String:

H I S C DDDD E B

Where:
H = Start of header X'01'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'40'
D = Status DATA0
D = Status DATA1
D = Status DATA2
D = Status DATA3
E = End of text X'03'
B = BCC

Notes: The status data bytes are broken down as follows:

DATA0

bit	If bit is set to '1'
0	Feed sensor blocked
1	Exit sensor blocked
2	ALWAYS = 0
3	Reset since last status message
4	Timing wheel sensor blocked
5	ALWAYS = 0
6	ALWAYS = 1

DATA1

bit	If bit is set to '1'
0	ALWAYS = 0
1	ALWAYS = 0
2	ALWAYS = 0
3	ALWAYS = 0
4	Calibrating double detect (performed when machine in idle mode)
5	ALWAYS = 0
6	ALWAYS = 1

DATA2 Set to the current average thickness of the documents being dispensed.
DATA 2 = 20 hex + THICKNESS

DATA3 Set to the current average length of the documents being dispensed.
DATA 3 = 20 hex + LENGTH

Command Description:

The Status command instructs the dispenser to return its current sensor and operational status.

Command Time out:

The recommended time out for this command is 10 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command X'41' PURGE

Command Message String:

T I S C O_1O_2 E B

Where:
- T = Start of Transmission X'04'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'41'
- O_1O_2 = Timeout (2 bytes), optional field. See optional timeout chapter 4.5
- E = End of text X'03'
- B = BCC

Reply Message String:

H I S C DDD E B

Where:
- H = Start of header X'01'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'41'
- D = DATA0
- D = DATA1
- D = DATA2
- E = End of text X'03'
- B = BCC

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation, (single character) see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Always 20 hex

Command Description:

The Purge command instructs the dispenser to remove all documents from the transport. Most documents will go to the reject area in the top of the note tray.

When the purge command is used to clear the transport following a jam or failure of the MINIMECH™, some or all of the notes may pass out of the delivery throat, depending on the fault condition. For this reason it is recommended that the purge command is only used in conjunction with responsible personnel. Normally operation does not require externally commanded purges.

The purge, reject and exit note counts may be based on suspect conditions, and for this reason are not guaranteed to be accurate.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'42' DISPENSE**

Command Message String:

T I S C Q O_1O_2 E B

Where:
- T = Start of Transmission X'04'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'42'
- Q = Quantity X'20' + amount
- O_1O_2 = Timeout (2 bytes), optional field. See optional timeout chapter 4.5
- E = End of text X'03'
- B = BCC

Reply Message String:

H I S C DDD E B

Where:
- H = Start of header X'01'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'42'
- D = DATA0
- D = DATA1
- D = DATA2
- E = End of text X'03'
- B = BCC

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Number of reject events. Single character, value = count + 20 hex

Command Description:

The Dispense command instructs the dispenser to pick a specified number of notes from the note tray and transport them past the exit. Invalid notes will be diverted to the reject area in the note tray and extra notes will be picked to replace them.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'43' TEST DISPENSE**

Command Message String:

T I S C Q O_1O_2 E B

Where:
T = Start of Transmission X'04'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'43'
Q = Quantity X'20' + amount
O_1O_2 = Timeout (2 bytes), optional field.
See optional timeout chapter 4.5
E = End of text X'03'
B = BCC

Reply Message String:

H I S C DDD E B

Where:
H = Start of header X'01'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'43'
D = DATA0
D = DATA1
D = DATA2
E = End of text X'03'
B = BCC

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Number of reject events. Single character, value = count + 20 hex

Command Description:

The Test Dispense command instructs the dispenser to pick a specified number of notes from the note tray and transport them to the reject area in the note tray.

The command is used for verifying correct performance of the MINIMECH™.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X’44’ RESET**

Command Message String:

T I S C E B

Where:

T	=	Start of Transmission	X’04’
I	=	Comm. identity	X’30’
S	=	Start of text	X’02’
C	=	Command	X’44’
E	=	End of text	X’03’
B	=	BCC	

Reply Message String:

-

Command Description

The Reset command instructs the dispenser to enter its power-up condition. The dispenser will acknowledge the reception of the command, but will not send a response message.

A status command will indicate whether or not the reset was successful. Note, the reset is a full hardware reset of the dispenser.

The machine is ready to receive new commands as soon as all three LEDs has been activated together. But there will be a delay of approximately 5 seconds (first double detect calibration) before the dispenser enters the idle mode and would start to execute a received command.

This is the only command that does not have a reply.

Command Time out:

-

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'45' LAST STATUS**

Command Message String:

T I S C E B

Where:	T	= Start of Transmission	X'04'
	I	= Comm. identity	X'30'
	S	= Start of text	X'02'
	C	= Command	X'45'
	E	= End of text	X'03'
	B	= BCC	

Reply Message String:

H I S C DDD E B

Where:	H	= Start of header	X'01'
	I	= Comm. identity	X'30'
	S	= Start of text	X'02'
	C	= Command	X'45'
	D	= DATA0	
	D	= DATA1	
	D	= DATA2	
	E	= End of text	X'03'
	B	= BCC	

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Number of reject events. Single character, value = count + 20 hex

Command Description:

The Last Status command instructs the dispenser to repeat the last operation completion status, i.e. the last Purge, Dispense or Test dispense status.

Command Time out:

The recommended time out for this command is 10 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'46' CONFIGURATION STATUS**

Command Message String:

T I S C E B

Where:	T	= Start of Transmission	X'04'
	I	= Comm. identity	X'30'
	S	= Start of text	X'02'
	C	= Command	X'46'
	E	= End of text	X'03'
	B	= BCC	

Reply Message String:

H I S C DDDD E B

Where:	H	= Start of header	X'01'
	I	= Comm. identity	X'30'
	S	= Start of text	X'02'
	C	= Command	X'46'
	D	= DATA0	
	D	= DATA1	
	D	= DATA2	
	D	= DATA3	
	E	= End of text	X'03'
	B	= BCC	

Notes: The configuration data bytes are broken down as follows

DATA0 Set to the firmware version number. DATA0 = VERSION + 20 hex
DATA1 Set to the firmware issue number. DATA1 = ISSUE + 20 hex

MINIMECH™ firmware is labelled 2011-XX.YY
where XX is the VERSION number and YY is the ISSUE number.

Note: DATA0 and DATA1 can only handle numeric versions and issues.

DATA2 is always set to 41 hex
DATA3 is always set to 40 hex

Command **X'46' CONFIGURATION STATUS**

Command Description:

The Configuration Status command instructs the dispenser to send its firmware and mechanical configuration.

Command Time out:

The recommended time out for this command is 10 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'47' DOUBLE DETECT DIAGNOSTICS**

Command Message String:

T I S C E B

Where:
T = Start of Transmission X'04'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'47'
E = End of text X'03'
B = BCC

Reply Message String:

H I S C DDDD E B

Where:
H = Start of header X'01'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'47'
D = DATA0
D = DATA1
D = DATA2
D = DATA3
E = End of text X'03'
B = BCC

Notes: The configuration data bytes are broken down as follows

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Double detect channel A idle average measurement. Value = measurement + 20 hex.
DATA2 - Double detect channel B idle average measurement. Value = measurement + 20 hex.
DATA3 - is always set to 20 hex.

Command **X'47' DOUBLE DETECT DIAGNOSTICS**

Command Description:

The double detect diagnostics command instructs the dispenser to operate its transport system and report the idle average measurement of the mechanical reference plate in the double detect.

This command is only required for diagnostics purposes.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X’48’ SENSOR DIAGNOSTICS**

Command Message String:

T I S C E B

Where:	T	= Start of Transmission	X’04’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	C	= Command	X’48’
	E	= End of text	X’03’
	B	= BCC	

Reply Message String:

H I S C DDDD E B

Where:	H	= Start of header	X’01’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	C	= Command	X’48’
	D	= DATA0	
	D	= DATA1	
	D	= DATA2	
	D	= DATA3	
	E	= End of text	X’03’
	B	= BCC	

Notes: The configuration data bytes are broken down as follows

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - The average thickness of the note fed. Single character, value = thickness + 20 hex
DATA2 - The average length of the note fed. Single character, value = length + 20 hex
DATA3 - is always set to 50 hex.

Command Description:

The sensor diagnostics command returns data concerning direct measurements of document thickness and length.

Notes should be present for this command. The dispenser will run the transport in the forward direction for a short period to ensure the system has stabilised and then it will feed and reject one note. The reply message consists of measurements taken on this note. No notes are dispensed from the delivery throat.

This command is only required for diagnostics purposes.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'4A' SINGLE NOTE DISPENSE**

Command Message String:

T I S C O_1O_2 P1P2 E B

Where:
- T = Start of Transmission X'04'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'4A'
- O_1O_2 = Timeout (2 bytes), optional field. See optional timeout chapter 4.5
- P_1P_2 = Protrusion (2 bytes), optional field. See protrusion chapter 4.6
- E = End of text X'03'
- B = BCC

Reply Message String:

H I S C DDD E B

Where:
- H = Start of header X'01'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'4A'
- D = DATA0
- D = DATA1
- D = DATA2
- E = End of text X'03'
- B = BCC

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Number of reject events. Single character, value = count + 20 hex

Command **X’4A’ SINGLE NOTE DISPENSE**

Command Description:

The Single Note Dispense command instructs the dispenser to pick one note and stop with the note protruding from the delivery throat.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'4B' SINGLE NOTE EJECT**

Command Message String:

T I S C O_1O_2 E B

Where:
- T = Start of Transmission X'04'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'4B'
- O_1O_2 = Timeout (2 bytes), optional field. See optional timeout chapter 4.5
- E = End of text X'03'
- B = BCC

Reply Message String:

H I S C DDD E B

Where:
- H = Start of header X'01'
- I = Comm. identity X'30'
- S = Start of text X'02'
- C = Command X'4B'
- D = DATA0
- D = DATA1
- D = DATA2
- E = End of text X'03'
- B = BCC

Notes: The status data bytes are broken down as follows:

DATA0 - Status code for operation (single character), see chapter 5.2
DATA1 - Number of notes past exit. Single character, value = count + 20 hex
DATA2 - Number of reject events. Single character, value = count + 20 hex

Command Description:

This command may be used after a Single Note Dispense to instruct the dispenser to drive the note held at the delivery throat fully out to the customer.

If there is no note at the exit, a standard purge will be performed.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X’54’ TEST MODE**

Command Message String:

T I S C E B

Where:	T	= Start of Transmission	X’04’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	C	= Command	X’54’
	E	= End of text	X’03’
	B	= BCC	

Reply Message String:

H I S C D E B

Where:	H	= Start of header	X’01’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	C	= Command	X’54’
	D	= DATA0	
	E	= End of text	X’03’
	B	= BCC	

Notes: DATA0 - Error status for operation is always X’20’ - Good Operation.
See also chapter 5.2

Command Description:

The test mode command is intended to be helpful in Talaris production and for customer verification of proper function of the MINIMECH™.

In test mode:

Sensors

- The three green LEDs on the MMC controller board indicates the exit sensor, feed sensor and transport clock sensors condition during and after the mechanical test stated below.

Mechanical

- The diverter mechanism is activated five times in each direction
- The note transport starts and stops five times
- The feed mechanism runs five times in each direction

The LEDs indicates the sensor status until any new command is sent to the MINIMECH™.

Command Time out:

The recommended time out for this command is 120 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

Command **X'52'X'44' READ DATA**

Command Message String:

T I S CC d nnn E B

Where:
T = Start of Transmission X'04'
I = Comm. identity X'30'
S = Start of text X'02'
C = Command X'52' X'44'
d = delimiter "/" X'2F'
nnn = item number(100) X'31' X'30' X'30'
E = End of text X'03'
B = BCC

Notes: This example shows when item 100 is read. (RD/100)

Reply Message String:

H I S DDDDDDDD E B

Where:
H = Start of header X'01'
I = Comm. identity X'30'
S = Start of text X'02'
D = DATA0 X'30'
DDDDDDDD = X'32' X'30' X'31' X'31' X'30' X'31' X'30' X'33'
E = End of text X'03'
B = BCC

Notes: DATA0 - Status code is 30 hex ('0') if the RD command was legal.
DATA0 - Status code is 4F hex ('O') if the RD command was illegal.

In this example is DDDDDDDD = "20110202" which is the program ID in the MINIMECH™.
The reply data string (DDDDDDDD), has varying length depending on which item that is read.

Command Time out:

The recommended time out for this command is 10 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

The RD command is used to read data from the MINIMECH™ internal data structures.

The following section contains a more detailed description of the read data items. The items supported in the MINIMECH™ are.

=

100	Program ID
101	Machine ID
104	Max number of notes in one transaction
115	Baudrate
116	Parity
303	Dispense counter (Lifelong)
304	Reject Counter (Lifelong)
305	Total processed counter (Lifelong)
306	Dispense counter (Trip)
307	Reject counter (Trip)
308	Total processed counter (Trip)
313	Transaction counter (Lifelong)
314	Transaction counter (Trip)
350	Throat sensor calibration value
501	Reject reason counter
502	Error Status counter
503	Machine status

Command **X’57’X’44’ WRITE DATA**

Command Message String:

T I S CC d nnn d DDDD E B

Where:	T	= Start of Transmission	X’04’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	C	= Command	X’57’ X’44’
	d	= delimiter “/”	X’2F’
	nnn	= item (115)	X’31’ X’31’ X’35’
	d	= delimiter “/”	X’2F’
	DDDD	= data (9600)	X’39 X’36 X’30 X’30
	E	= End of text	X’03’
	B	= BCC	

Notes: This example show when the baudrate is set to 9600 BPS. (WD/115/9600)
The write data string DDDD, has varying length depending on the data written with the WD command.

Reply Message String:

H I S D E B

Where	H	= Start of header	X’01’
	I	= Comm. identity	X’30’
	S	= Start of text	X’02’
	D	= DATA0	
	E	= End of text	X’03’
	B	= BCC	

Notes: DATA0 - Status code is 30 hex (‘0’) if the WD command was legal.
DATA0 - Status code is 4F hex (‘O’) if the WD command was illegal.

Command Time out:

The recommended time out for this command is 10 seconds.

Status Codes:

See chapter 5.2 status code cross-reference

The WD command is used to write data to the MINIMECH^{TM} internal data structures.

The following section contains a more detailed description of the write data items.
The items supported in the MINIMECH^{TM} are:

101	Machine ID
104	Max number of notes in one transaction
115	Baudrate
116	Parity
306	Notes dispensed (Trip)
307	Notes rejected (Trip)
308	Notes processed (Trip)
314	Transaction counter (Trip)
392	Learning notes
501	Reject reason counter
502	Error status counter

=

READ/WRITE DATA ITEMS DESCRIPTION

Item	Name	Read / Write	Description	Example
100	Program ID	R	Returns the program ID from the MINIMECH™.	RD/100
101	Machine ID	RW	Set or get the machine ID. 10 arbitrary ASCII characters to make the mechs individual.	WD/101/Mech2 RD/101
104	Max. trans.	RW	Set or get the maximum number of notes in a transaction. Default is 50. Legal values 1-50.	WD/104/10 RD/104
115	Baudrate	RW	Set or get the custom configured baudrate. Default is 4800. Legal values are 1200, 4800 and 9600 BPS	WD/115/9600 RD/115
116	Parity	RW	Set or get the custom configured parity. Default is Even. ('E') Legal parity is Even or Odd. ('O')	WD/116/E RD/116
303	Dispense counter (Life)	R	Gets the total number of notes dispensed since the machine was new.	RD/303
304	Reject counter (Life)	R	Gets the total number reject events since the machine was new.	RD/304
305	Processed counter (Life)	R	Gets the total number of notes processed since the machine was new.	RD/305
306	Dispense counter (Trip)	RW	Gets the total number of notes dispensed since this counter was cleared. Cleared by writing '0' to it.	RD/306 WD/306/0
307	Reject counter (Trip)	RW	Gets the total number of reject events since this counter was cleared. Cleared by writing '0' to it.	RD/307 WD/307/0
308	Processed counter (Trip)	RW	Gets the total number of notes processed since this counter was cleared. Cleared by writing '0' to it.	RD/308 WD/308/0
313	Transaction counter (Life)	R	Gets the total number of transactions since the machine was new.	RD/313
314	Transaction counter (Trip)	RW	Gets the total number of transactions since this counter was cleared. Cleared by writing '0' to it.	RD/314 WD/314/0
350	Throat sensor calibration value	R	Throat sensor calibration value in %	RD/350
392	Learning notes	W	Writing '0' to this item clears the current note parameters such as length and thickness. This will put the machine in Learning-notes mode. A Learning-notes sequence will start at the next dispense command. This dispense command must request 1 note only. Otherwise will the reply be Illegal command.	WD/392/0

Item	Name	Read / Write	Description	Example
501	Reject reason counter	RW	Reads out information regarding the reject reasons with coding as below. 1- Not seen in feed 3 - Close First, 4 - Close After 5 - Long A, 6 - Long B 7 - Thick A, 8 - Thick B 9 - Short A, 10 - Short B 11 - Thin A, 12 - Thin B 13 - Skew A, 14 - Skew B To clear the reject counters, write '0' to it.	Thick A RD/501/7 Short B RD/501/10 WD/501/0
502	Error status counter	RW	Reads out information regarding the number of error status with coding as below. 1 – Feed failure 4 – Mistracked note at exit 5 – Too long at exit 6 – Blocked exit 10 – Transport error 12 – Double detect error 13 - Diverter error 14 - Wrong count 15 - Note missing at double detect 16 - Reject rate exceeded 20 - Non volatile ram error 22 - Operation timeout 23 - Internal queue error To clear the error counters, write '0' to it.	Transport error RD/502/10 Feed failure RD/502/1 WD/502/0
503	Machine status	R	The internal machine status can be read out with this item. The LEDs on the MMC flashes also these numbers if any status but NO_ERROR occurs. Se chapter 2.5. 10 – OPERATION_TIMEOUT 19 - FEED_SENS_ERROR 20 - FEED_ERROR 21 - TOO_MANY_REJECTS 30 - NOTE_STUCK_IN_FEED 31 - NOTE_STUCK_IN_DDA 32 - NOTE_STUCK_IN_DDB 33 - NOTE_STUCK_IN_TRT 42 - TRANSP_START_ERROR 43 - TRANSP_RUNNING_ERROR 55 - NOT_REACHED_DD 57 - NOT_REACHED_TRT 62 - UNEXPECTED_TRT_NOTE 70 - FEED_QUEUE_OVERFLOW 71 - DD_QUEUE_OVERFLOW 72 - DIV_QUEUE_OVERFLOW 73 - TRT_QUEUE_OVERFLOW 74 - REJ_QUEUE_OVERFLOW 90 - TOO_MANY_NOTES_DELIVERED 92 - TROAT_BLOCKED 93 - UNABLE_TO_CALIBR_THROAT 97 - UNABLE_TO_CALIBR_DDA 98 - UNABLE_TO_CALIBR_DDB 99 - NVRAM_ERROR	Machine status RD/503

4.5 Optional timeout

For the movement commands Dispense, Test dispense, Single note dispense, Single note eject and Purge there is a possibility to instruct the dispenser to use a command timeout different from the standard 2 minutes. This is called the optional timeout and is activated by adding two bytes to the command.

The bytes that can be added are:

O_1	(Field separator)	X'1C'
O_2	(Time variable 0-9)	X'30' - X'39'

The new timeout is defined as:

Command timeout = 20 sec + O_2 * 10 sec

The command timeout can therefore be adjusted between 20 sec and 1 min 50 sec with the optional timeout parameters

O_2	ASCII	Command timeout (sec)
X'30'	0	20
X'31'	1	30
X'32'	2	40
X'33'	3	50
X'34'	4	60
X'35'	5	70
X'36'	6	80
X'37'	7	90
X'38'	8	100
X'39'	9	110

This is an example what the Dispense 3 notes with optional timeout 40 seconds would look like.

Start of Transmission	X'04'	
Comm. identity	X'30'	
Start of text	X'02'	
Command	X'42'	(Dispense command)
Quantity	X'23'	(3 notes)
Timeout (O_1O_2)	X'1C' X'32'	(Field sep. and ascii 2. Timeout= 20+2*10 sec)
End of text	X'03'	
BCC	X'7A'	

NOTE! A short timeout period may not give sufficient time for the dispenser to recover from persistent problems, such as feed hesitancy. The optional timeout only affect the current command.

4.6 Protrusion

In the single note dispense command there is a possibility to add two bytes for setting of the note protrusion. However the protrusion setting **does not** affect the note protrusion of the notes when the single dispense command is issued on the MINIMECH™.

The only reason why the machine does accept these two bytes is to keep this command compatible with the SDD 1700 command.

The bytes that can be added are:

P_1	(Protrusion separator)	X’50’
P_2	(Length variable 0-8)	X’30’ - X’38’

As stated above, It is possible to add protrusion information in the command. But it **has not** any effect on the protrusion of the single note dispense command.

5 STATUS HANDLING

5

5.1 Introduction

This Section describes in detail each individual status code sent back to the host by the MINIMECH™.

Each one of the Status Codes, will be provided with following information:

Status Code.
Mnemonic name.
Status Description.
Applicable Commands.
Recommended Actions.
Recommended Operator Message.

5.2 Status code cross reference

		ASCII character	Status	Purge	Dispense	Test Dispense	Reset	Last Status	Configuration Status	Double Detect Diagnostics	Sensor Diagnostics	Single Note Dispense	Single Note Eject	Test Mode	Read Data	Write Data
			X'40'	X'41'	X'42'	X'43'	X'44'	X'45'	X'46'	X'47'	X'48'	X'4A'	X'4B'	X´54	X'52'X'44'	X'57'X'44'
ASCII character			@	A	B	C	D	E	F	G	H	J	K	T	RD	WD
Good Operation	**X'20'**			X	X	X		X		X	X	X	X	X		
Feed Failure	**X'21'**	!		X	X	X		X		X	X	X	X			
Mistracked Note At Exit	**X'24'**	$			X	X		X			X	X				
Too Long At Exit	**X'25'**	%			X	X		X			X	X				
Blocked Exit	**X'26'**	&		X	X	X		X		X	X	X	X			
Transport Error	**X'2A'**	*		X	X	X		X		X	X	X	X			
Double Detect Error	**X'2C'**	,		X	X	X		X		X	X	X	X			
Diverter Error	**X'2D'**	-			X	X		X			X	X				
Wrong Count	**X'2E'**	.			X	X		X			X	X				
Note Missing At DD	**X'2F'**	/			X	X		X			X	X				
Reject Rate Exceeded	**X'30'**	0			X	X		X			X	X				
Non Volatile RAM Error	**X'34'**	4		X	X	X		X		X	X	X	X			
Operation Timeout	**X'36'**	6		X	X	X		X		X	X	X	X			
Internal Que Error	**X'37'**	7			X	X		X			X	X				
Invalid Command	**X'4F'**	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Only data	**-**	-	X						X						X	X

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This cross-reference table shows relations between possible commands and status codes in the MINIMECH™ communication.

NOTE! The last row with *'Only data'* indicates that four commands don't have a status code. Instead there are only data in the reply.

GOOD OPERATION STATUS **X’20’**

Status Description:

This status is sent to the host, when the command has been successfully executed.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

No action is required.

Operator Message:

There is no recommended message for this status.

Status Description:

This status is sent to the host when there is a failure to pick notes from the note tray. This can be due to empty note tray, a jam in the note tray, faulty feed sensor or a faulty pick mechanism.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

If the cassette is empty it should be removed and filled using the normal procedure.

If there are notes in the note tray, the loading of the notes must be corrected. Notes jammed in the feed sensor can also be a cause to this problem. Clear jams and perform a Purge command. If the error status persists, call for service.

Operator Message:

The recommended message that the Application Program should send to the operator is:

21 - FEED FAILURE - CHECK THE NOTE TRAY

MISTRACKED NOTE AT EXIT STATUS X'24'

Status Description:

This status arises if there is a note seen by the exit sensor when there shouldn't be a note in the exit sensor. The reason can be that the diverter blade has failed to reject a note that should go to the reject area, but has instead entered the exit sensor.

This status can also occur if there are notes already in transport before the start of the transaction.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

24 - MISTRACKED NOTE AT EXIT

Status Description:

This status are reported if the exit sensor is covered for a longer time than allowed for current notes. Probably by a note jammed in the exit sensor.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

25 - TOO LONG AT EXIT

BLOCKED EXIT STATUS **X'26'**

Status Description:

This status appears when the exit sensor is covered when the dispense starts. This could be due to a note covering the exit or a faulty exit sensor.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error is caused by an unsuccessful calibration of the Exit sensor it is not cleared with a Purge command. In this case make a Test Dispense to recalibrate the Exit sensor

The Exit sensor will be calibrated on a normal Dispense or a Test Dispense command, but it will not be calibrated on a Single Note Dispense command.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

26 - BLOCKED EXIT. ** REMOVE OBSTACLES FROM EXIT **

Status Description:

This status occurs when the transport speed is lower or higher than expected. This could be due to a faulty clock sensor, faulty timing wheel, faulty main motor or if notes have jammed and are stalling the transport.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

2A – TRANSPORT ERROR

DOUBLE DETECT ERROR STATUS X'2C'

Status Description:

This error can appear if the double detect is unable to calibrate or if notes appear to be too long. The reason is probably a faulty double detect, dirty double detect, too much ambient light on the double detect or a note jammed under the double detect.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

2C - DOUBLE DETECT ERROR

Status Description:

This status appears if the diverter blade fails to deliver a note that should go out to the delivery throat, but went down to the reject area. This can also be reported if there is a jam in or before the diverter blade.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

2D - DIVERTER ERROR

WRONG COUNT STATUS **X'2E'**

Status Description:

This status appears when the count at the exit is greater than the number of requested notes.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

2E - WRONG COUNT

NOTE MISSING AT DOUBLE DETECT STATUS **X'2F'**

Status Description:

This status may appear if the double detect has failed to detect a note already seen by the feed sensor. This could be due to a faulty double detect or if the notes jam in the transport before the double detect.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The machine must be inspected and jam situations must be cleared. Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

2F - NOTE MISSING AT DOUBLE DETECT

REJECT RATE EXCEEDED STATUS **X'30'**

Status Description:

This status appears if there are 8 reject events during the current dispense.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The application should repeat the transaction, if the status appeared due to low quality notes.

Operator Message:

The recommended message that the Application Program should send to the operator is:

30 - REJECT RATE EXCEEDED, CHECK NOTES

NON VOLATILE RAM ERROR STATUS **X'34'**

Status Description:

This status appears if the MINIMECH™ has identified a static error in its parameter holding non volatile random access memory which cannot be automatically corrected. This can be due to a faulty MINIMECH™ Machine Controller board.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

Switch off and on the machine. A learning note procedure will be required after the machine has been switched on.

Perform a Purge command and if it is successful, issue Dispense command to verify proper function.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

34 – NON VOLATILE RAM ERROR

OPERATION TIMEOUT STATUS **X'36'**

Status Description:

This status appears if the current operation has exceeded the command timeout, and has been terminated. The command timeout is by default 120 seconds for movement commands and 10 seconds for other commands. Some of the movement commands can have a shorter timeout due to optional timeout parameters. (See chapter 4.5)

This status can be due to a hesitant feed or a faulty Machine Controller.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

The Application Program can make a retry with the same command as used when the problem occurred. If the problem still remains, the machine must be taken out of service.

Operator Message:

The recommended message that the Application Program should send to the operator is:

36 - OPERATION TIMEOUT

Status Description:

This status appears if the internal note queues are corrupted. The operation will be terminated. This could be due to a faulty Machine Controller, jam situations, or notes torn apart.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

Switch off and on the machine. Perform a Purge and issue a new Dispense.

If the error status persists, the machine must be put out of service until revised by a Field Service Engineer.

Operator Message:

The recommended message that the Application Program should send to the operator is:

37 - INTERNAL QUEUE ERROR

Status Description:

This status appears if a command is sent to the machine that includes invalid characters or is not supported by the machine.

Applicable Commands:

See chapter 5.2 status code cross-reference

Recommended Actions:

Retry the command and make sure it is in its correct format.

Operator Message:

The recommended message that the Application Program should send to the operator is:

4F - INVALID COMMAND

6 COMMUNICATION INTERFACE

6

The MINIMECH™ Machine Controller, MMC, is equipped with one standard 25-pin D-sub communication port referenced with the name J1.

6.1 Electrical and mechanical characteristics

In the following text the logical state "ON" is referred to as active and the logical state "OFF" as inactive.

All interface signals meets the electrical specification of CCITT recommendation V.24 and EIA RS-232-C in asynchronous mode, with 1 START BIT, 7 DATA BITS + 1 PARITY BIT and 1 STOP BIT,

Signals:	Data Signals			Logical	"1" :	below -3 V
				Logical	"0" :	above +3 V
	Control Signals	"OFF"	= logical	"0"	:	below -3 V
		"ON"	= logical	"1"	:	above +3 V

Voltages are in reference to signal ground.

The port have its connector located on the MINIMECH™ Machine Controller board. The connectors are a 25 pin male D-sub connector.

6.2 Baudrate and parity

Communication with the MINIMECH^{TM} takes place by default at the baudrate 4800 BPS and even parity.

However it is possible in the default setting (4800,E), to write new settings for baudrate and parity through the items 115 and 116.

Available baudrates are 1200, 2400, 4800 and 9600 BPS. New baudrate is set by writing the new baudrate to item 115. Example: **WD/115/9600** sets new baudrate 9600 BPS. The setting can be verified with **RD/115.**

The parity can be set to even 'E' or odd 'O'. New parity is set by writing to item 116. Example: **WD/116/O** sets new parity odd. The setting can be verified with **RD/116.**

Jumper1 (Custom configuration) controls the communication settings. If jumper1 **is open** during system boot, the system will always run with default values. (4800 BPS and Even parity)

If jumper1 **is closed** during system boot, the system runs with values set with item 115 and 116.

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6.3 Interface signals

The following signals are defined in the MINIMECH^{TM} application command port J1:

Circuit				
CCITT	EIA	PIN	IN/OUT	Signal name
103	BA	2	OUT	TxD Transmit Data
104	BB	3	IN	RxD Receive Data
105	CA	4	OUT	RTS Request to Send
106	CB	5	IN	CTS Clear to Send
102	AB	7	-	SG Signal Ground

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6.4 Character coding

The MINIMECH™ uses ISO 646 character coding

	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	‘	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	”	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	´	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI		/	US	O	_	o	

Table 6.01.(1): Standard ASCII code set

6.5 BCC Calculation

In all messages sent between the host and the MINIMECH^{TM}, the last byte is always a checksum byte (BCC). The BCC calculation is a XOR operation of the previous bytes in the message.

BCC = Byte1 XOR Byte2 XOR Byte3… and so on.

As an example: Command Purge ‘A’

EOT	Start of transmission	(04 hex)
ID	Comm. identity	(30 hex)
STX	Start of text	(02 hex)
‘A’	Purge command	(41 hex)
ETX	End of text	(03 hex)
BCC	Block check char	(74 hex)

(BCC = 04hex XOR 30hex XOR 02hex XOR 41hex XOR 03hex = 74hex)

6.6 Control signals and cables

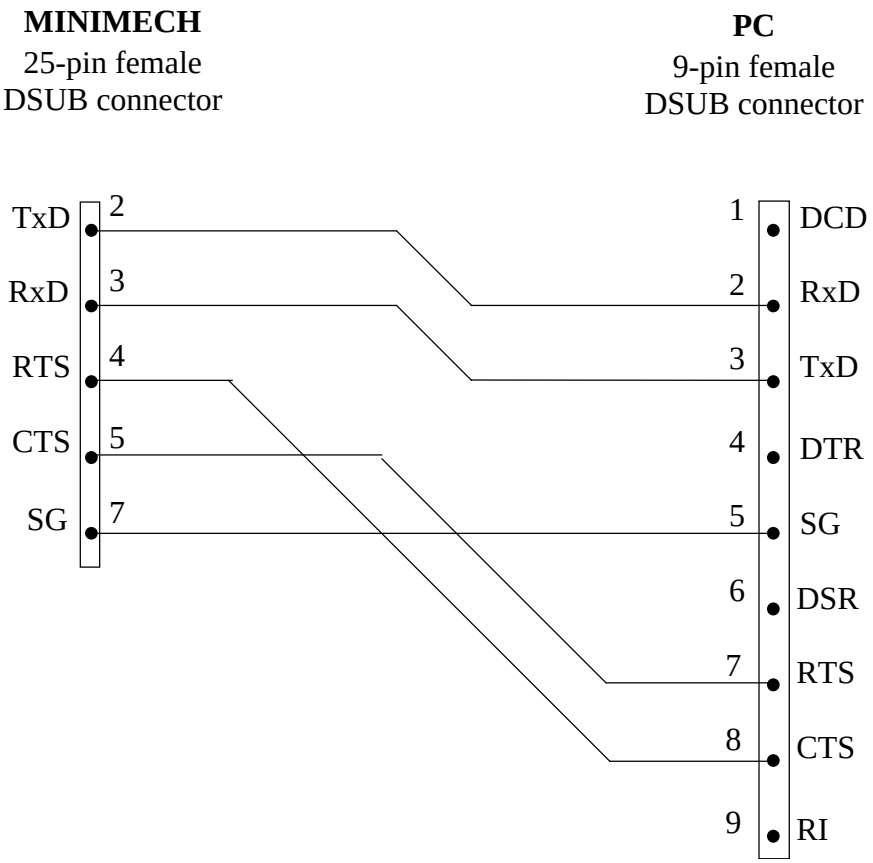
There are two different possibilities to communicate with the MINIMECH^{TM}, with or without handshaking.

6.6.1 Communication with handshake

In normal situations, when handshaking is required, the control signals in the MINIMECH^{TM} end are used in the following way:

When the MINIMECH^{TM} wants to transmit something to the host, it turns on the RTS (Request To Send) circuit. It will not start to transmit until the CTS (Clear To Send) circuit has been activated from the host. Using these circuits the host may prevent the MINIMECH^{TM} from transmitting until it is ready to receive.

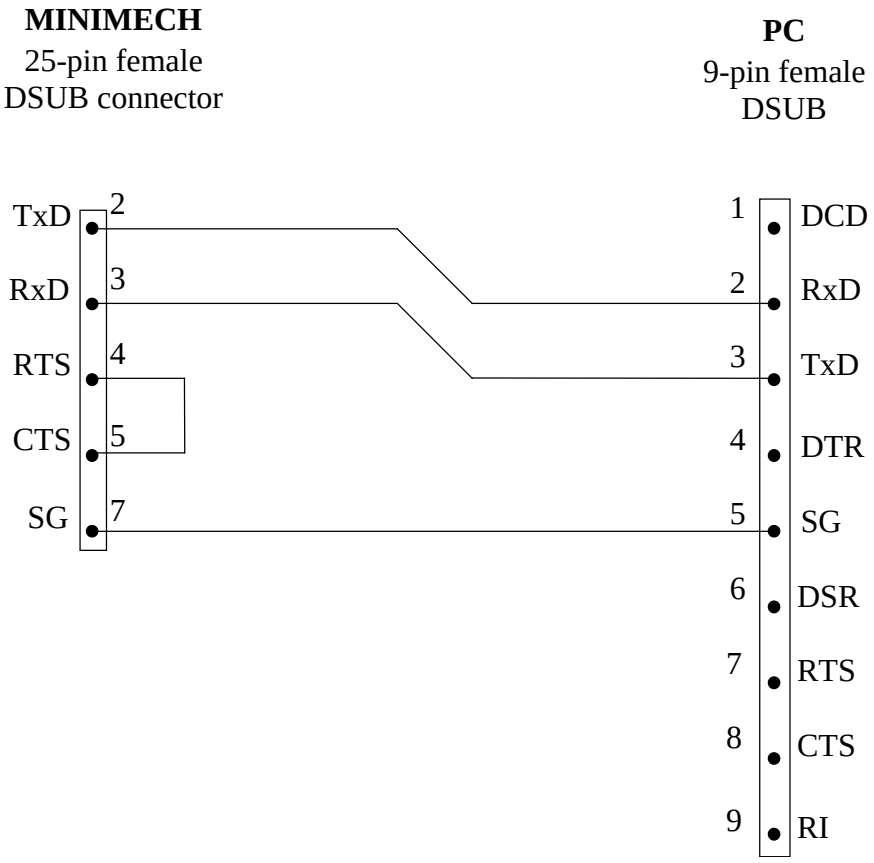
Similarly a message may be temporarily halted if the host deactivates the CTS circuit. In this case the message will be completed as soon as the CTS circuit becomes active again.



Schematics for MINIMECH™ communication with handshake

6.6.2 Communication without handshake

If no handshaking is required, the RTS and CTS (pins 4 and 5) circuits must be connected together.

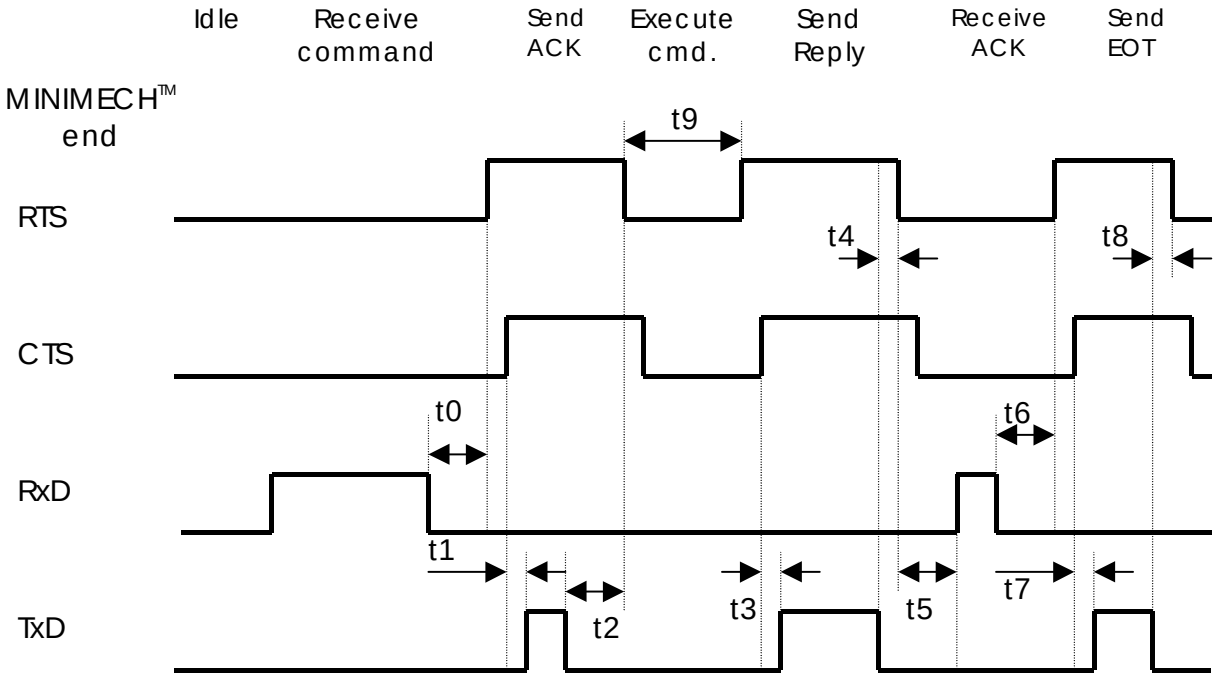


Schematics for MINIMECH™ communication without handshake

6.7 Signal timing

This is an example showing a normal communication sequence in the MiniMech™ end of the communication cable. The example shows communication **with** handshake control. The handshake circuits is only activated when the dispenser has something to send.

If handshake with the host **is not** required, pins 4 & 5 in the 25 pin DSUB connector must be connected together according to chapter 6.6.2. This will have the effect that CTS = RTS and communication timing are stated **only by** the RxD and TxD lines below.



Description	Name	Min (ms)	Max (ms)
Delay before dispenser issues RTS for sending ACK	t0	-	10
Delay between CTS activated and ACK sending	t1	-	10
Time between ACK is sent and RTS deactivated	t2	25	75
Delay between CTS activated and reply sending	t3	-	10
Time between reply is sent and RTS deactivated	t4	5	15
Max time waiting for ACK from host	t5	-	500
Delay before dispenser issues RTS for sending EOT	t6	-	10
Delay between CTS activated and EOT sending	t7	-	10
Time between EOT is sent and RTS deactivated	t8	5	15
Time to execute command	t9	25	120000
Inter-character spacing		-	500

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